

# Service Manual

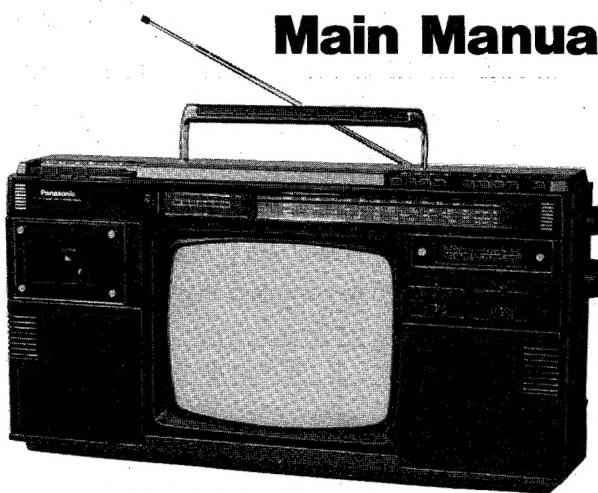
Black and White Television with Stereo Radio Cassette

**TR-1230X**

**Chassis Model No. 12B01-A/E**

**Chassis Family No. 12B01**

**Main Manual**



## Specifications

### Television

**Power Source:** AC: 120/220/240V, 50/60Hz, DC: 12V  
**Power Consumption:** AC: 50W, DC: 19W

**Antenna Impedance:** VHF/UHF/FM/SW Monopole antenna 75Ω  
 VHF/UHF/FM/SW External antenna 300Ω

**Receiving Channels:** VHF: USA 2–6, 7–13  
 CCIR 3–4, 5–10  
 Italian C,Gch  
 UHF: USA 14–83ch  
 CCIR 21–69ch  
 UK 21–69ch

**Intermediate Frequency:** Video: 45.74MHz  
 Sound: 41.25MHz (USA)  
 40.25MHz (CCIA/EUR)  
 39.75MHz (CCIA/UK)

**Integrated Circuit:** 13  
**Semiconductor:** 30 Transistors  
**(with Radio and Cassette Recorder)** 55 Diodes  
**Nominal Anode Voltage:** 1 H.V. Rectifier  
 14.0KV (Zero Beam Current)

**Picture Tube:** 310JHB4, 12inches, 90° Deflection  
**Speaker:** 2-Way 4-speakers System

**Automatic Circuits:** Woofer: 12cm x 2  
 Tweeter: 3cm x 2  
 Peak Automatic Gain Control  
 Saw-Tooth Automatic Frequency Control

**Dimensions:** Automatic Voltage Regulator  
 Height: 32.6cm

Width: 64.3cm

Depth: 32.1cm

**Weight:** 12.2kg

### Stereo Radio Cassette

**Motor:** Mechanical governor motor  
**Frequency Response:** 80Hz – 15KHz  
**Recording System:** AC bias with 45.5/47.5KHz  
 (Beat Proof Selector)

**Operation:** Push button one-touch operation  
 with Auto-Stop and mechanical pause

**Tape Speed:** 4.8cm/s. (1-7/8 ips.)  
**Program Time:** 1 hour with C-60 cassette tape  
**Fast Forward and Rewind Time:** Approx. 120 seconds with C-60 cassette tape  
**Track System:** 4 track 2 channel stereo recording and playback  
**Input:** MIC: sensitivity 0.25mV/applicable microphone impedance  
 200-600M (L&R)

LINE IN: 420mV/50KΩ (L&R)  
 LINE OUT: 380mV/47KΩ (L&R)  
 EXT Speaker terminal: 8Ω (L&R)  
**REMOTE:** for manual start and stop

**Radio Frequency Range:** FM 87.5–108MHz  
 LW 145–285KHz  
 MW 530–1605KHz  
 SW 5.9–18.0MHz  
**Sound Output:** 5W + 5W (Max.)  
**Accessories:** Car Batter Cord (TSX8365)

Specifications are subject to change without notice.

**Panasonic**®

Matsushita Electric Trading Co.  
 P.O. Box 288, Central O

## SAFETY PRECAUTIONS

### GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer between the television set and the ac power line before servicing the chassis.
2. In servicing, pay attention to the original lead dress, especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.
3. After servicing, observe that all the protective devices such as insulation barriers, insulation papers, shields, isolation and R-C combinations, are properly installed.
4. Before turning the receiver on, check the resistance between the B+ line chassis ground. Connect  $\ominus$  side of an ohmmeter to B+ line and  $\oplus$  side to ground. Each line should have more resistance than specified below.

B+ line	Minimum Resistance
+11.5V	34 Ohms

5. When the TV set will not be used for a long period of time, unplug the power cord from the ac line outlet.
6. Potentials as high as 14.0 kV are present when this receiver is operating. Operation of the receiver without the rear cover on involves a danger of shock. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment. Always discharge the anode of the picture tube to the receiver chassis before handling the tube.
7. After servicing make the following leakage current check to protect the customer from a potential shock hazard.

### LEAKAGE CURRENT COLD CHECK

1. Unplug the ac cord and connect a jumper between the two prongs on the plug.
2. Turn on the receiver power switch on.
3. Measure the resistance value with an ohmmeter between the jumpered ac plug and each exposed metallic part such as screwheads, antennas, control shafts, handle bracket, etc. When the exposed metallic part has a return path to the chassis, the reading should be 1.8 megohm to 4.0 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity.
4. Remove the jumper from the ac plug.

### LEAKAGE CURRENT HOT CHECK

1. Plug the ac cord directly into the ac outlet. Do not use an isolation transformer during this check.
2. Connect a 1500 ohm, 10 watt resistor, paralleled by a  $0.15\mu F$  capacitor between each exposed metallic part and a good earth ground like a water pipe as shown in Fig. 1.
3. Use an ac voltmeter with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Move the resistor connection to each exposed metallic part and measure the voltage.
5. Reverse the polarity of the ac plug in the ac outlet and repeat the above measurement.
6. The potential must not exceed 0.75 volt rms, from any exposed metal part to ground.

If in case any of the measurements exceed the limits specified, there is a possibility of a shock hazard and the receiver should be repaired and rechecked before it is returned to the customer.

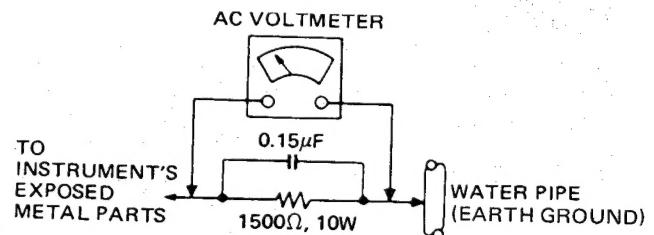


Fig. 1

### X-RADIATION

**WARNING:** The potential source of X-Radiation in TV sets is the picture tube.

- NOTE:** It is important to use an accurate periodically calibrated high voltage meter.
1. Turn the Brightness control fully counterclockwise.
  2. Measure the High Voltage. The high voltage meter should indicate a nominal 14.0kV and the maximum of 20.5kV. If the upper meter indication exceeds the maximum level, immediate service is required to prevent the possibility of premature component failure.
  3. To prevent the possibility of X-Radiation it is essential to use the specified picture tube.

## DISASSEMBLY INSTRUCTIONS

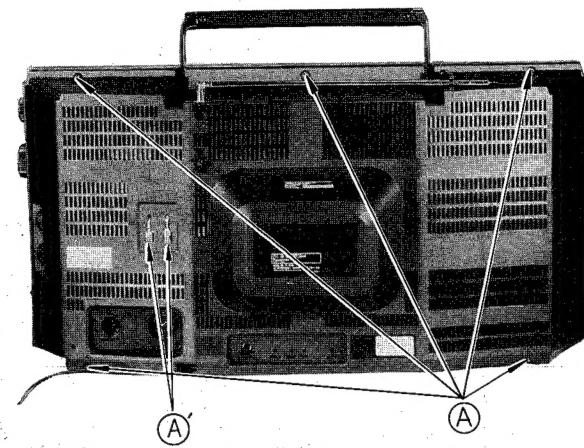


Fig. 4

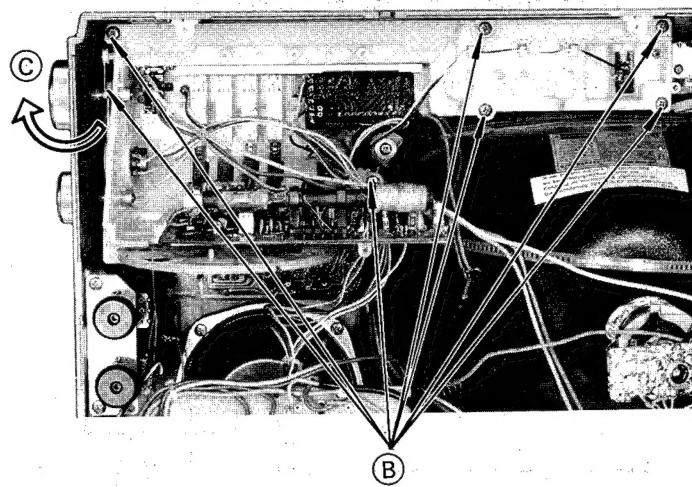


Fig. 5

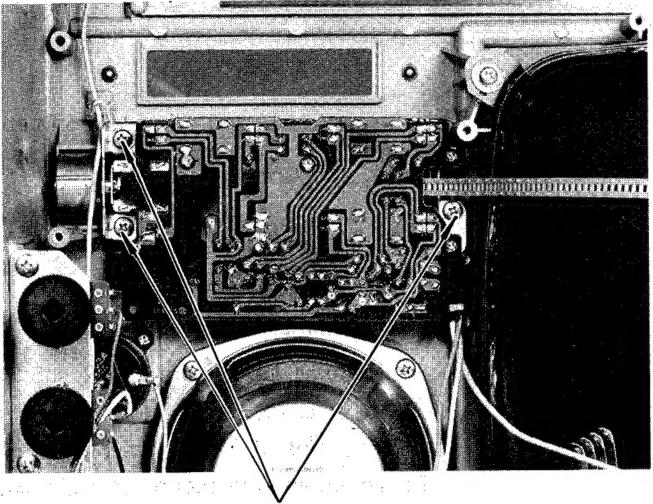


Fig. 6

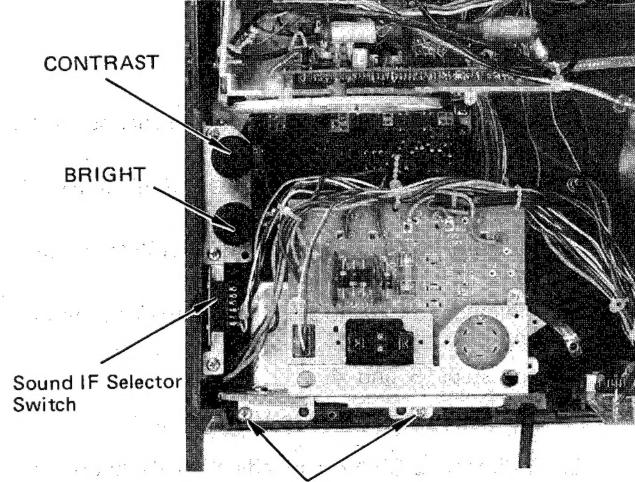


Fig. 7

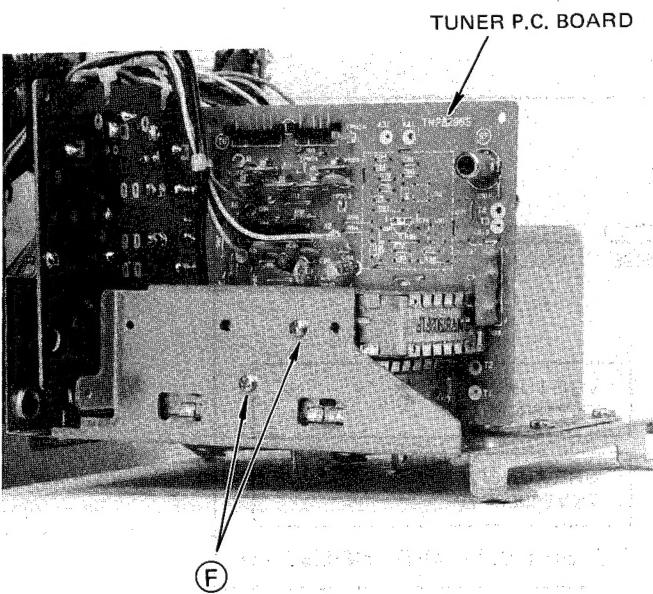


Fig. 8

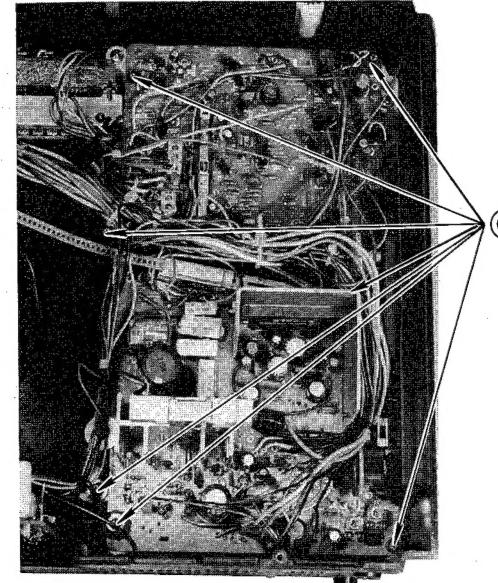


Fig. 9

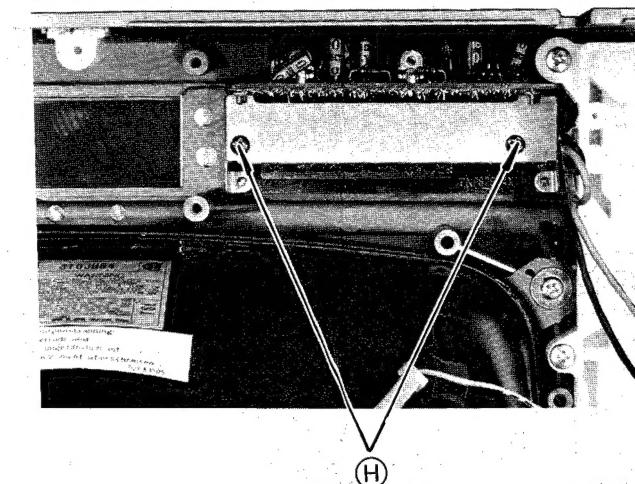


Fig. 10

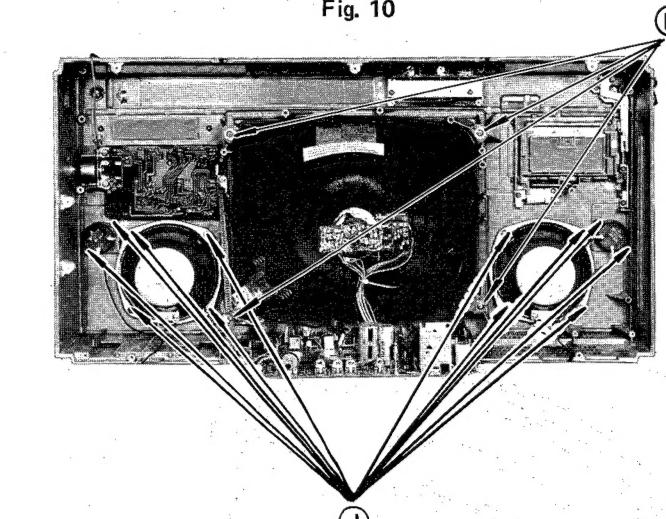


Fig. 11

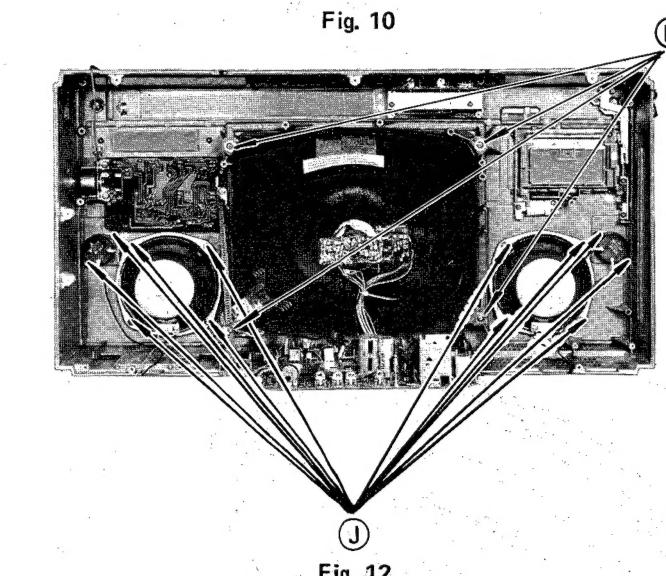


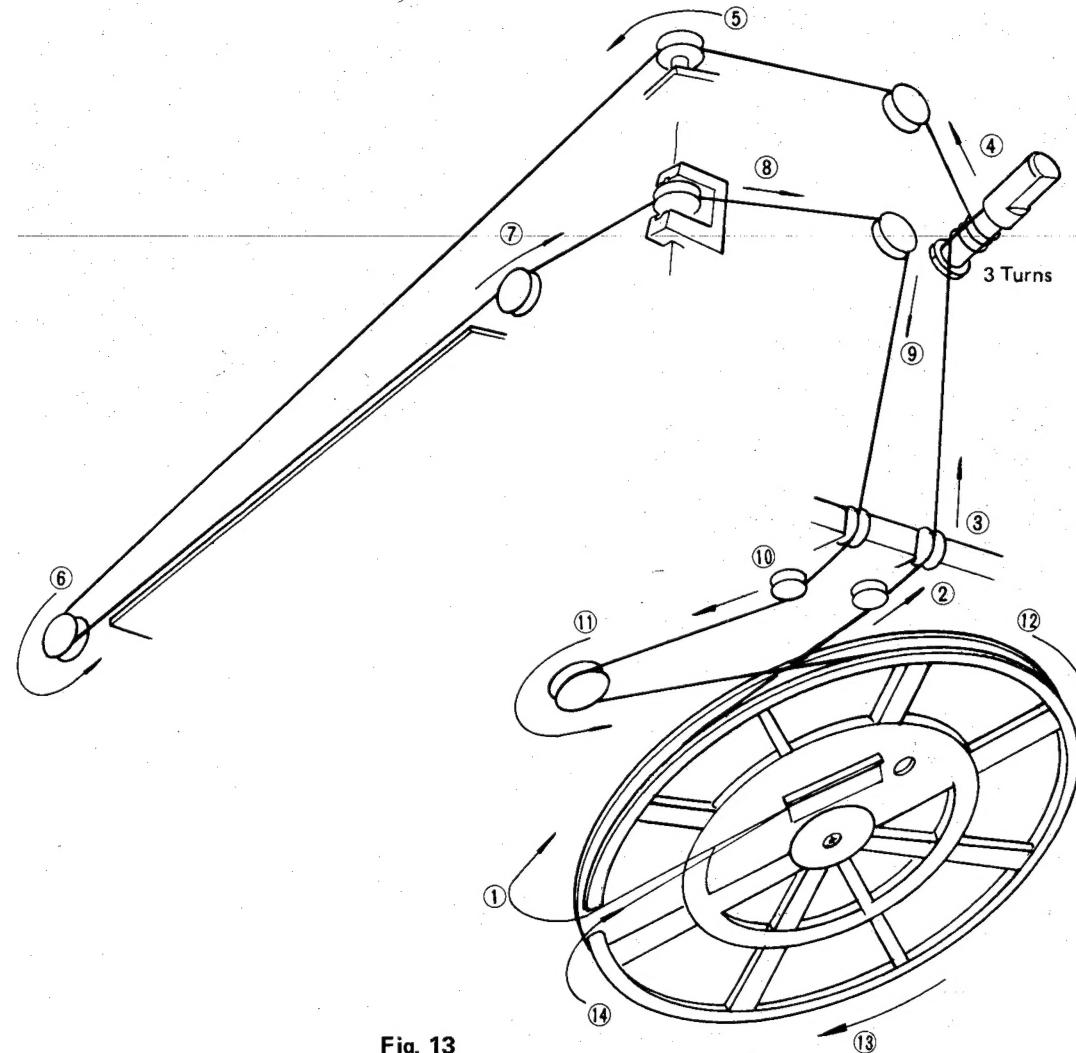
Fig. 12

Procedure	To remove ——.	Remove ——.	Shown in Fig. ——.
1	Rear Cover	<ul style="list-style-type: none"> <li>• 5 screws..... A (XTB4+20AFCx5)</li> <li>• (Loose 2 screws)..... A'</li> </ul>	4
2	Indicator Block	<ul style="list-style-type: none"> <li>• Radio tuning knob and TV tuning knob</li> <li>• 7 screws ..... B (XTB3+10Ax7)</li> <li>• Pull the cabinet in the direction arrow C</li> </ul>	5
3	Control Panel Block	<ul style="list-style-type: none"> <li>• The knobs on the panel</li> <li>• 3 screws ..... D (XTB3+8Ax3)</li> </ul>	6
4	Power Block	<ul style="list-style-type: none"> <li>• Volume Block and sound IF selector switch</li> <li>• 2 screws..... E (XTB4+10A)</li> <li>• (RP) TU and (TB) connectors</li> </ul>	7
5	Tuner Block	<ul style="list-style-type: none"> <li>• 2 screws ..... F (XSN3+4S)</li> </ul>	8
6	Audio P.C. Board	<ul style="list-style-type: none"> <li>• 8 screws ..... G ..... (THE210Zx7)</li> <li>• CL Connector and wire ..... (THE506-2x1)</li> </ul>	9
7	LED P.C. Board	<ul style="list-style-type: none"> <li>• 2 screws ..... H (XTV3+10A)</li> </ul>	10
8	Cassette Block	<ul style="list-style-type: none"> <li>• 4 screws ..... I (XTB4+35A)</li> </ul>	11
9	Speaker	<ul style="list-style-type: none"> <li>• 12 screws ..... J (XTB4+10Ax8)</li> <li>• 12 screws ..... J (XTB3+10Ax4)</li> </ul>	12
10	Picture Tube	<ul style="list-style-type: none"> <li>• 4 screws ..... K (THE399-2)</li> </ul>	12

## DIAL THREADING

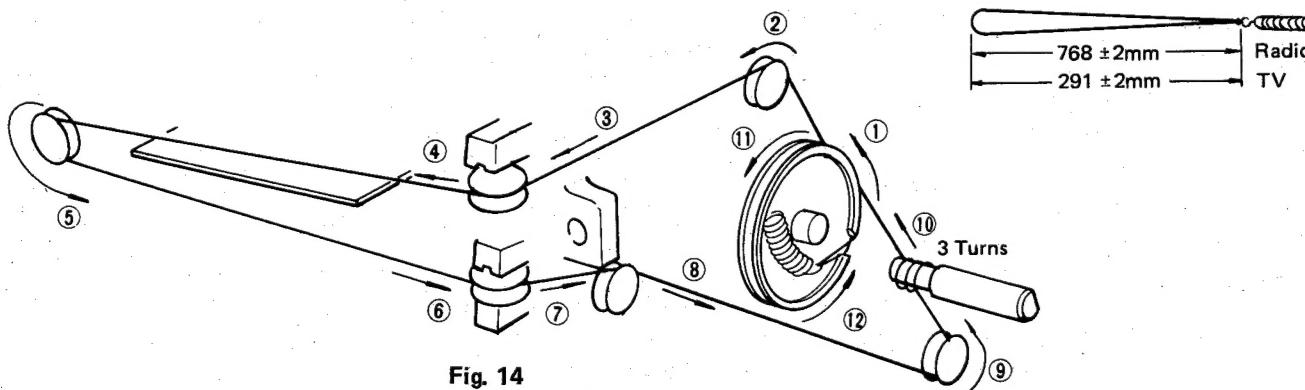
### Radio

1. Remove chassis from cabinet.
2. Turn dial drum to clockwise.
3. Arrows (① — ⑯) indicate correct order and indication of dial threading as shown in Fig. 13.



### TV

1. Remove chassis from cabinet.
2. Turn dial drum to clockwise.
3. Arrows (① — ⑯) indicate correct order and indication dial threading as shown in Fig. 14.



## GENERAL ALIGNMENT

### TV INDICATOR ALIGNMENT

#### Preparation

1. Set up voltmeter as shown Fig. 15.
2. Maintain power supply voltage at 220 volt.

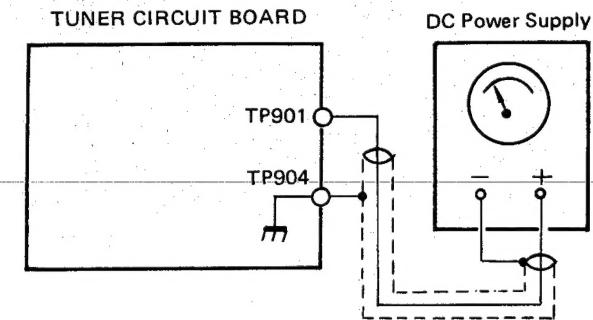


Fig. 15

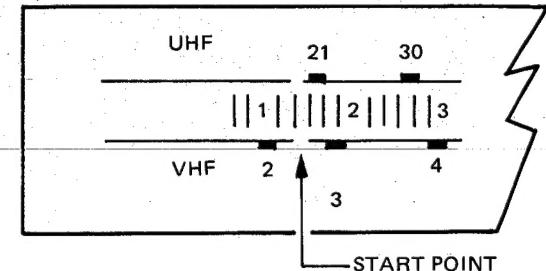


Fig. 16

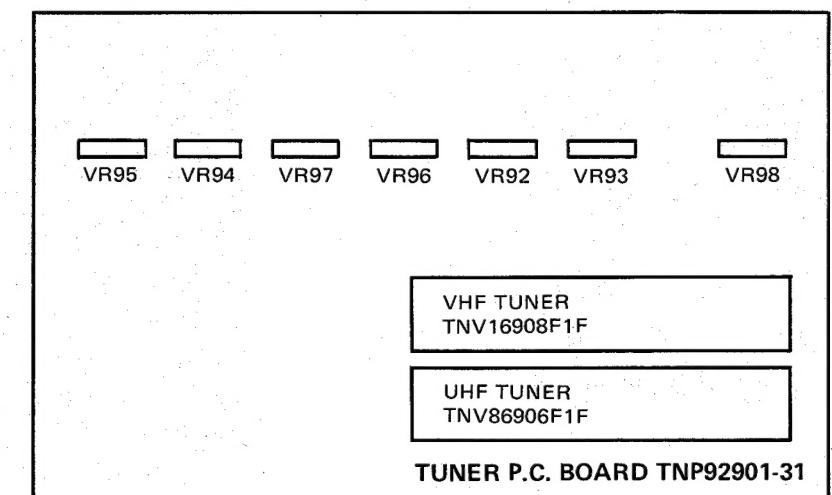
### ALIGNMENT PROCEDURE

1. Set selector switch to TV position and channel switch to UHF position.
2. Connect a voltmeter between IC91 terminal NO. 3 and ground.
3. Set indicator to CH E21 and adjust VR93 to obtain 1.02V.
4. Set indicator to CHA53 and adjust VR95 to obtain 11.02V.
5. Repeat steps 3 and 4.
6. Set channel band switch to VHF position.
7. Set indicator to CHA2 and adjust VR92 to obtain 1.35V.
8. Set indicator to CHA6 and adjust VR94 to obtain 15.27V.
9. Repeat steps 7 and 8.
10. Set indicator to CHA11 and adjust VR96 to obtain 10.23V.
11. Set indicator to CHE5 and adjust VR97 to obtain 5.6V.
12. Repeat steps 10 and 11.

NOTE: The following condition are required.

VHF: To obtain the picture at ch2, ch5, ch6, ch10, ch11, +0.5ch from the correct indication points is acceptable.

UHF: To obtain the picture at ch21, ch25, ch53, ch83, +2ch from the correct indication points is acceptable.



TUNER P.C. BOARD TNP92901-31

# RADIO ALIGNMENT

## RADIO IF (455kHz) ADJUSTMENT CONNECTION

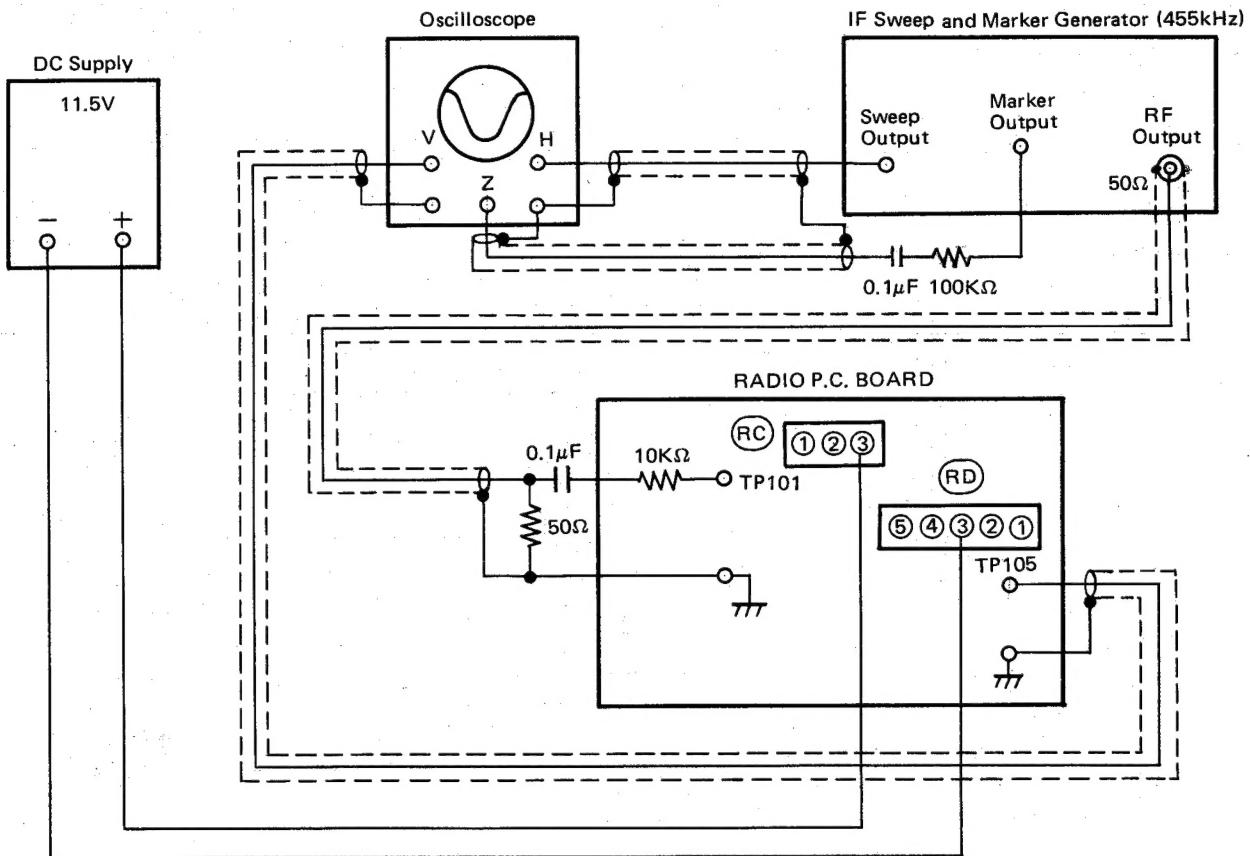


Fig. 18

## ALIGNMENT STEP

1. Set band select switch to MW position.
2. Adjust T1101, T1102 and T1103 to obtain the wave form as shown in Fig. 19.

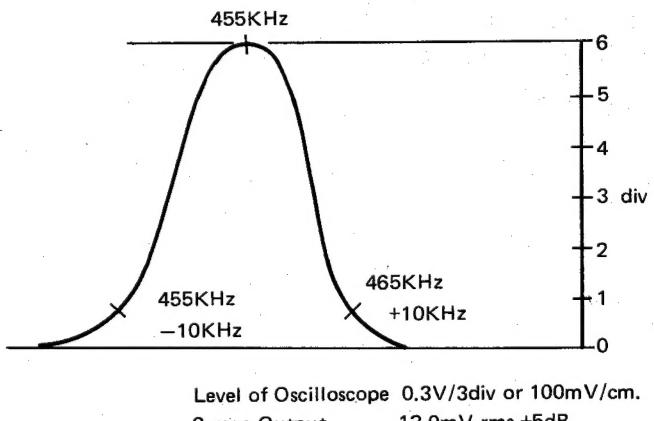


Fig. 19

## RADIO IF (10.7MHz) ADJUSTMENT CONNECTION

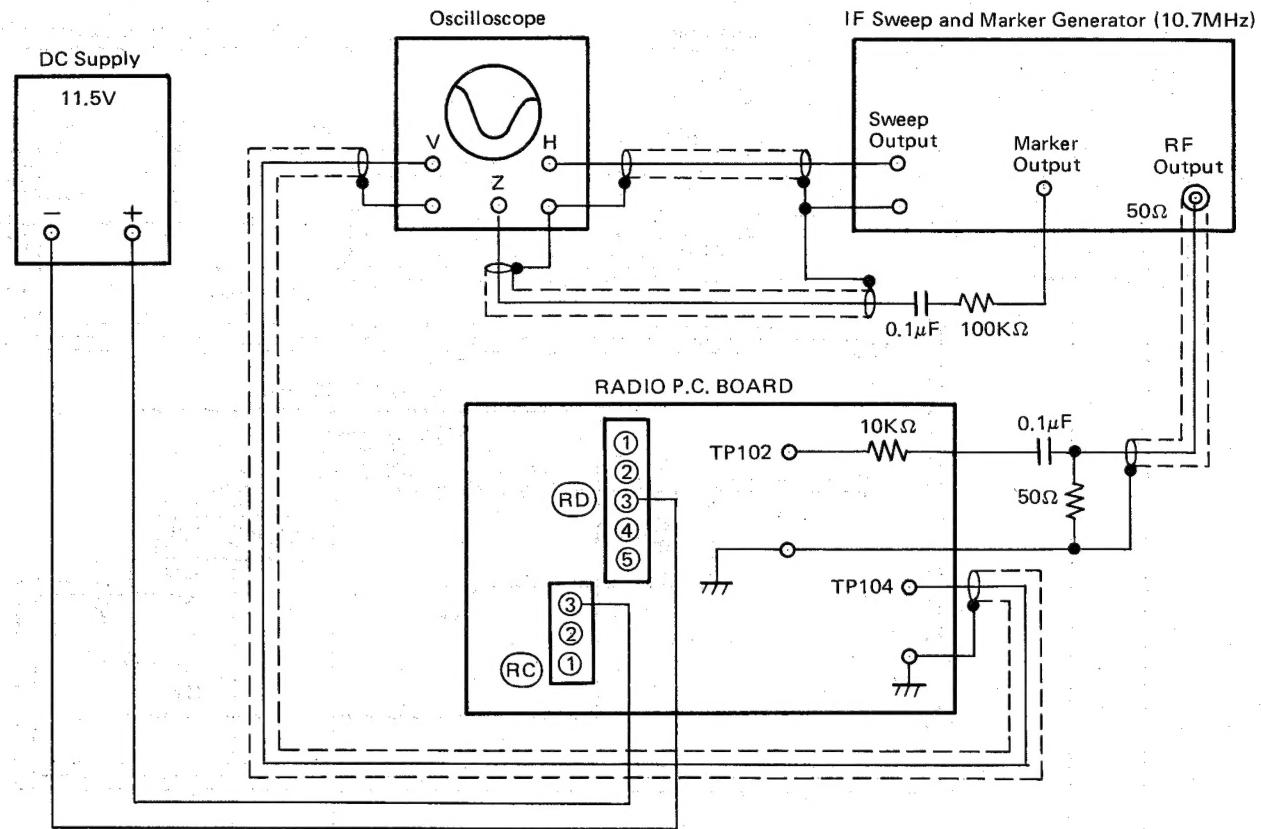
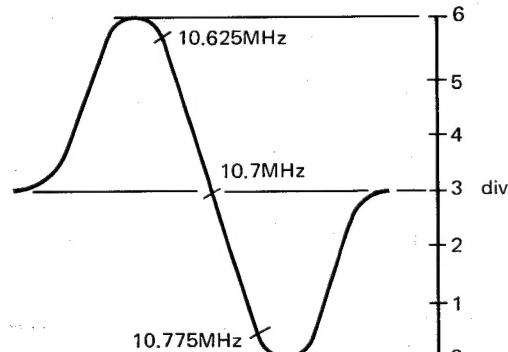


Fig. 20

## ALIGNMENT STEP

1. Set band select switch to FM position.
2. Adjust T1003 until the 10.7kHz marker is at the center of slanted line as shown in Fig. 21.
3. Adjust T1001, T1002 and T1003 to obtain the waveform as shown in Fig. 21.



Level of Oscilloscope 0.3V/3div or 100mV/cm  
Sweep Output 3.5mVrms ±5dB

Fig. 21

## MW/LW TRACKING ADJUSTMENT CONNECTION

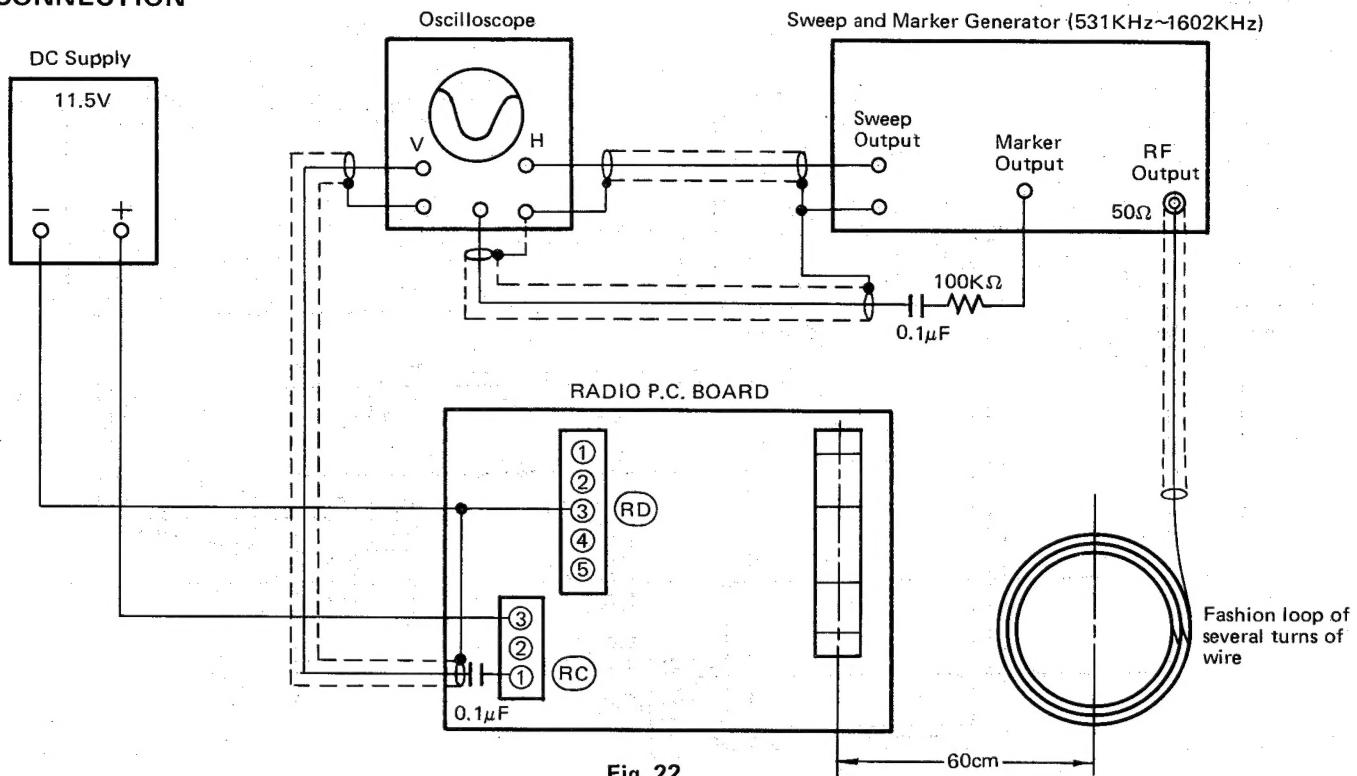


Fig. 22

### ALIGNMENT STEP MW TRACKING

1. Set band select switch to **MW** position.
2. Set radio indicator to **600kHz** position.
3. Adjust L1105 to obtain maximum output at **600kHz** marker as in Fig. 23.
4. Set radio indicator to **1400kHz**.
5. Adjust C1111 of trimmer to maximum output at **1400kHz** marker as in Fig. 23
6. Repeat step 2 – 5 several times to set radio indicator to correct position.
7. Set radio indicator to **600kHz** position.
8. Adjust a direction of L1102 to obtain the maximum amplitude. (Note: After this adjustment is done, L1102 should be fixed by paraffin)
9. Set radio indicator to **1400kHz** position.

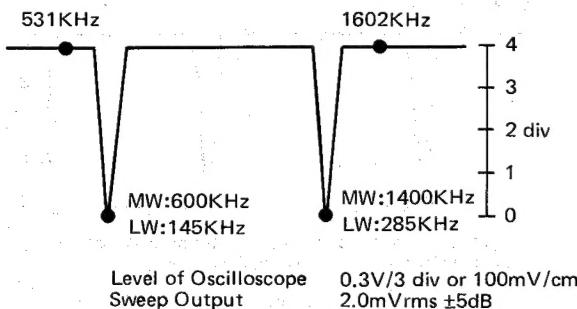


Fig. 23

10. Adjust C1103 of trimmer to obtain the maximum amplitude.
11. Repeat step 7 – 10 several times to obtain the maximum amplitude at both **600kHz** and **1400kHz** marker as in Fig. 23.

### LW TRACKING

1. Set band select switch to **LW** position.
2. Set radio indicator to **145kHz** position.
3. Adjust L1104 to obtain maximum output at **145kHz** marker as in Fig. 23.
4. Set radio indicator to **285kHz**.
5. Adjust C1110 of trimmer to maximum output at **285kHz** marker as in Fig. 23.
6. Repeat step 2 – 5 several times to set radio indicator to correct position.
7. Set radio indicator to **145kHz** position.
8. Adjust a direction of L1102 to obtain the maximum amplitude. (Note: After this adjustment is done L1102 should be fixed by paraffin)
9. Set radio indicator to **285kHz** position
10. Adjust C1102 of trimmer to obtain the maximum amplitude.
11. Repeat step 7 – 10 several time to obtain the maximum amplitude at both **145kHz** and **285kHz** marker as in Fig. 23.

## SW TRACKING ADJUSTMENT CONNECTION

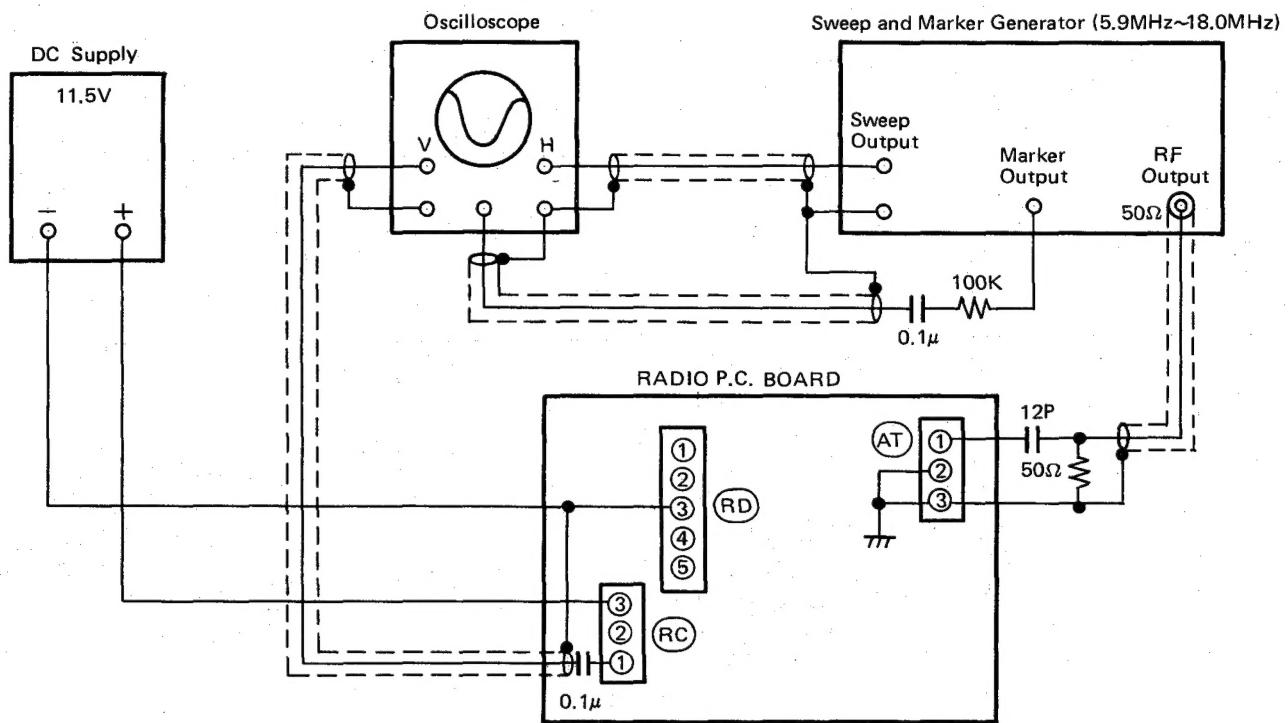


Fig. 24

## ALIGNMENT STEP

1. Set band selector switch to **SW** position.
2. Set radio indicator to **6.0MHz** position.
3. Adjust L1106 to obtain maximum output at **6.0MHz** marker as in Fig. 25.
4. Set radio indicator to **18.0MHz**.
5. Adjust C1 of P.V.C. trimmer (See Fig. 25.) to obtain maximum output at **18.0MHz** marker as in Fig. 25.
6. Repeat step 2 – 5 several times to set radio indicator to correct position.
7. Set radio indicator to **6.0MHz** position.
8. Adjust a direction of L1103 to obtain the maximum amplitude.
9. Set radio indicator **18.0MHz** position.
10. Adjust C2 of P.V.C. trimmer to obtain the maximum amplitude.
11. Repeat step 7 – 10 several times to obtain the maximum amplitude at both **6.0MHz** and **18.0MHz** marker as in Fig. 25.

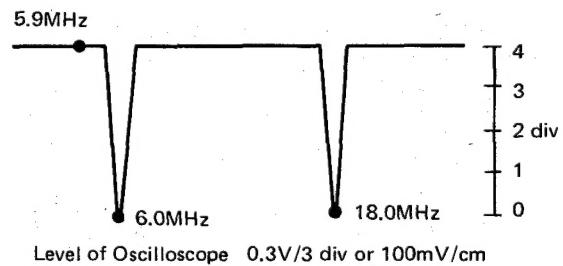
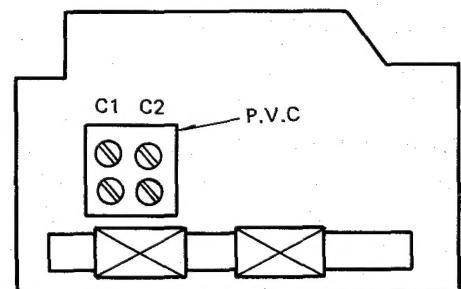


Fig. 25

## FM TRACKING ADJUSTMENT CONNECTION

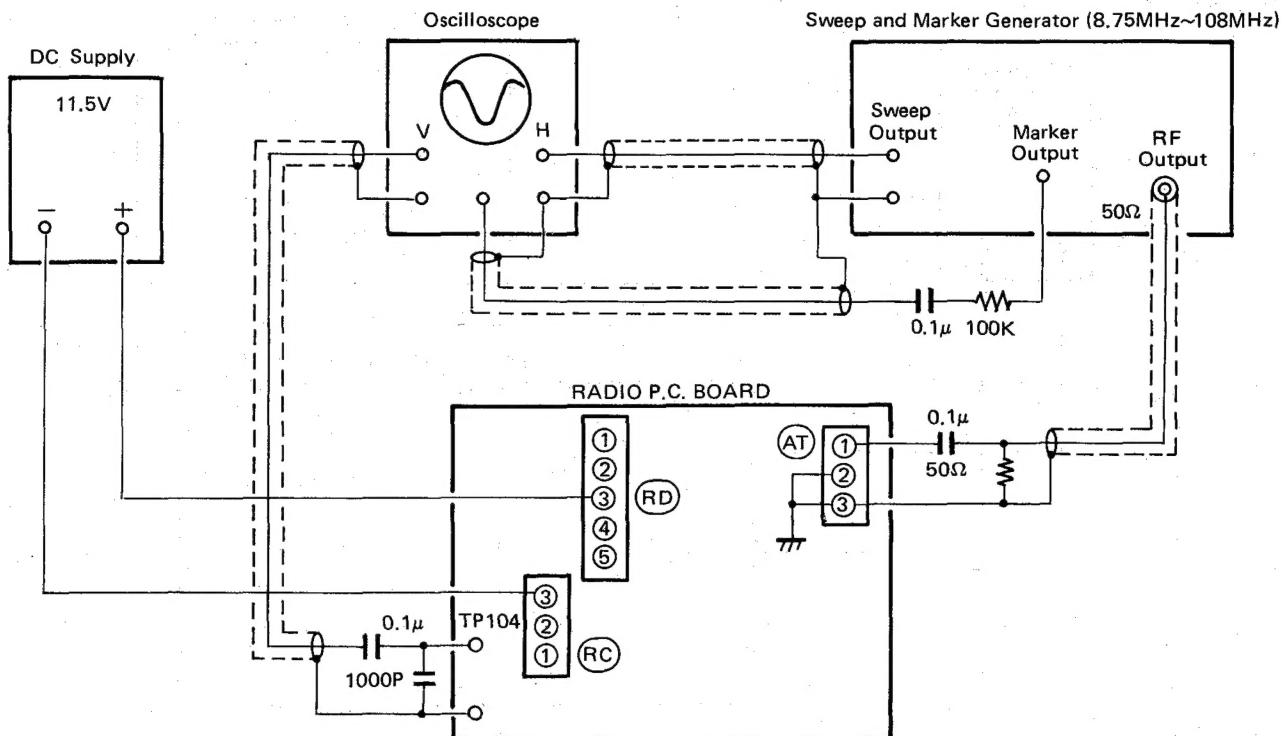


Fig. 26

## ALIGNMENT STEP

1. Set band selector switch to **FM** position.
2. Set radio indicator to **90MHz** position.
3. Adjust L1002 to set **90MHz** marker to the center of slanted line as shown in Fig. 27.
4. Set radio indicator to **106MHz** position.
5. Adjust FC1 of P.V.C. trimmer to set **106MHz** marker to the center of slanted line as shown in Fig. 27.
6. Repeat step 2 – 5 several times to set radio indicator to correct position.
7. Set radio indicator to **90MHz** position.
8. Adjust L1001 to obtain the maximum amplitude.
9. Set radio indicator to **106MHz** position.
10. Adjust FC2 of P.V.C. trimmer to obtain the maximum amplitude.
11. Repeat step 7 – 10 several times to obtain the maximum amplitude at both **90MHz** and **106MHz** marker as in Fig. 27.

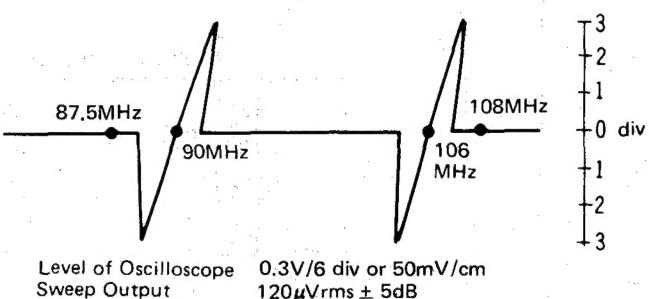
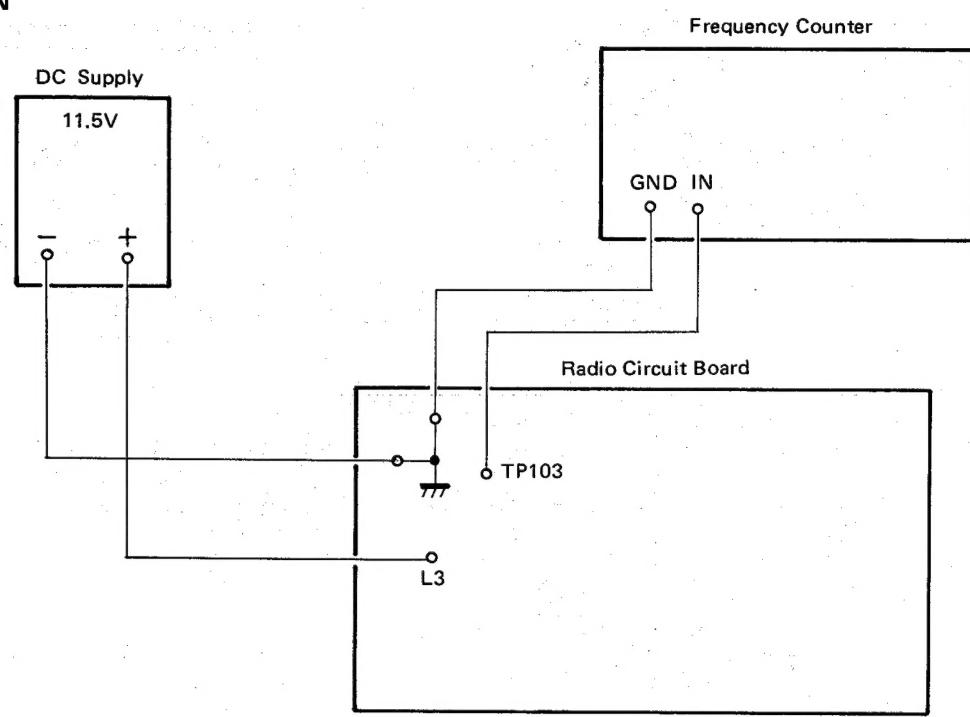


Fig. 27

# STEREO ALIGNMENT

## 19KHz ALIGNMENT CONNECTION



## ALIGNMENT

Adjust VR101 to obtain  $19\text{kHz} \pm 0.1\text{kHz}$ .

Fig. 28

## SEPARATION ALIGNMENT CONNECTION

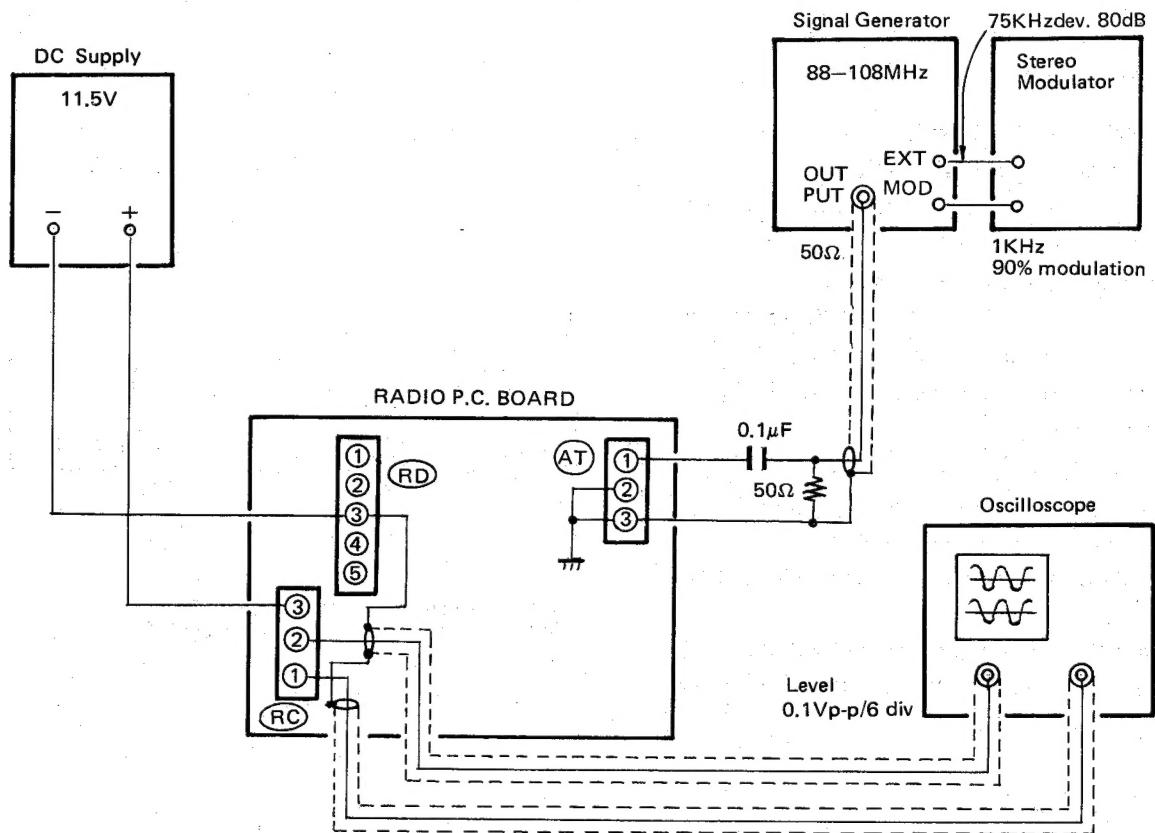


Fig. 29

## ALIGNMENT STEP

1. Set band select switch to **FM** position.
2. Set mode switch to stereo position and balance control to "**L**" (left) position.
3. Adjust VR102 to obtain the minimum "**R**" (right) output.
4. Set balance control to "**R**" (right) position.
5. Adjust VR102 to obtain the minimum "**L**" (left) output.

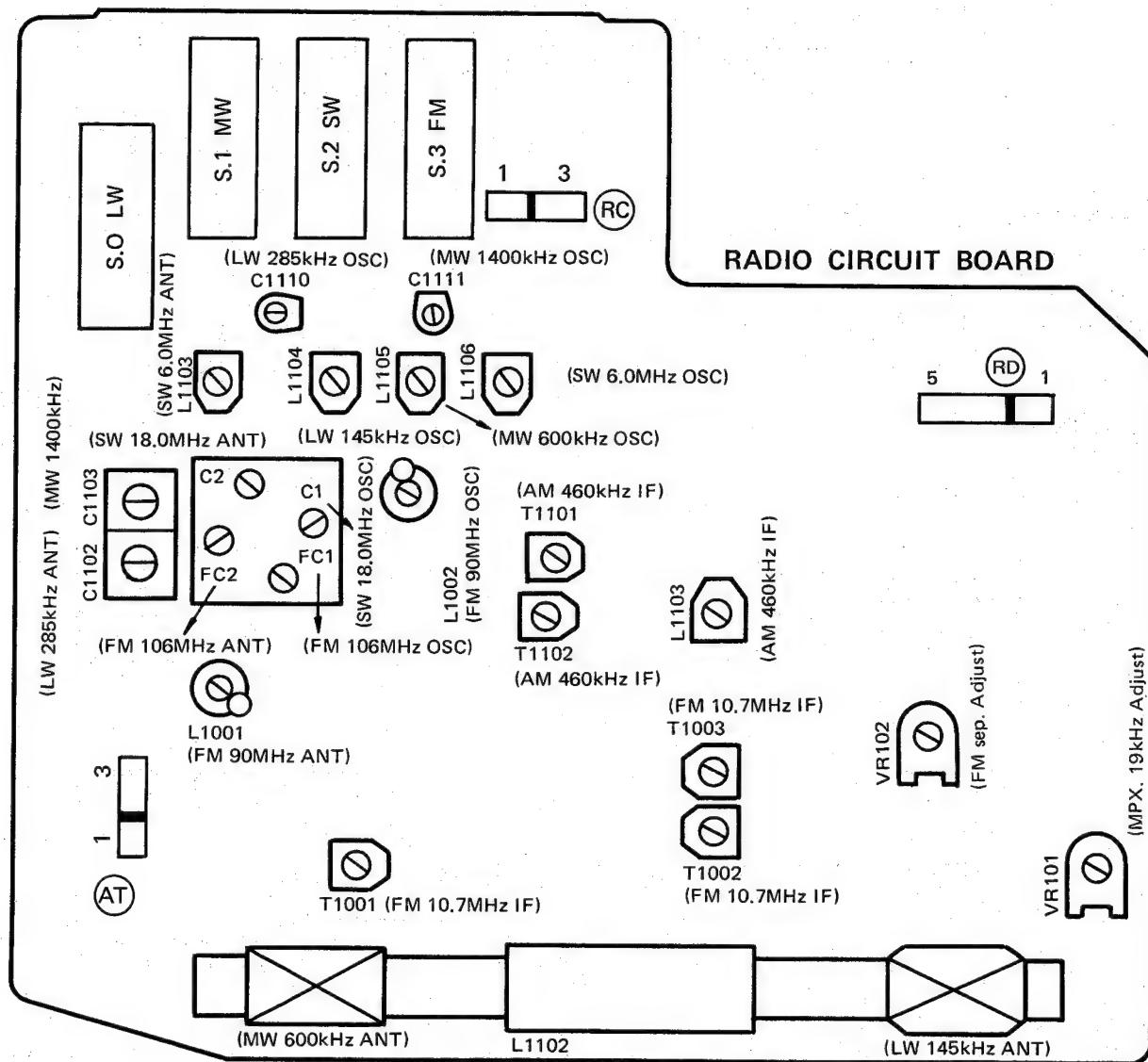


Fig. 30 Control Location

# CASSETTE TAPE RECORDER ALIGNMENT

## TRAP COIL ALIGNMENT

### Preparation

- Set up Oscilloscope and DC power supply as shown in Fig. 31.

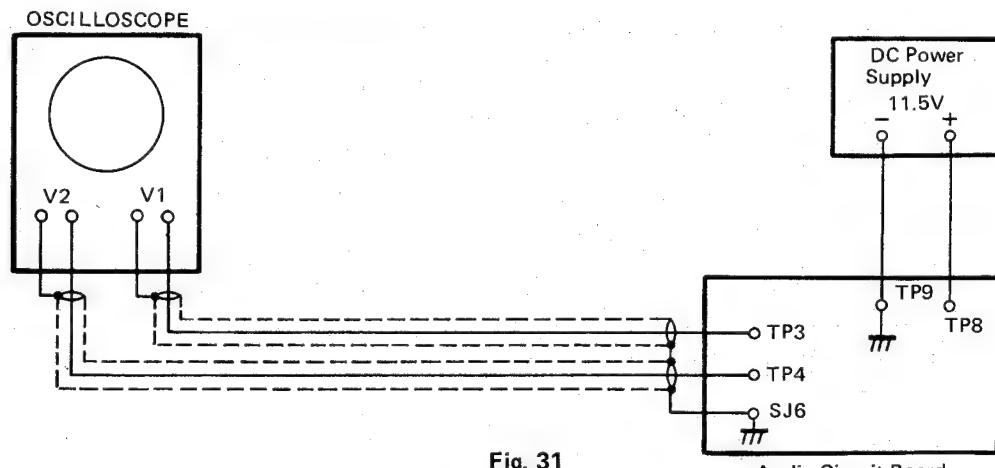


Fig. 31

### Alignment Procedure

- Set VR141 and VR151 to center position.
- Set tape recorder to recording mode.
- Adjust L1401 and L1501 to obtain minimum level.

## BIAS ALIGNMENT

### Preparation

- Set up Voltmeter and DC power supply as shown in Fig. 33.

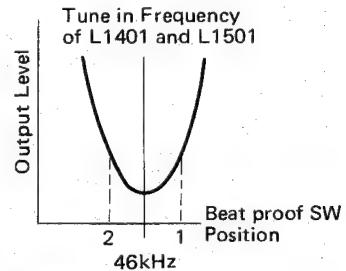


Fig. 32

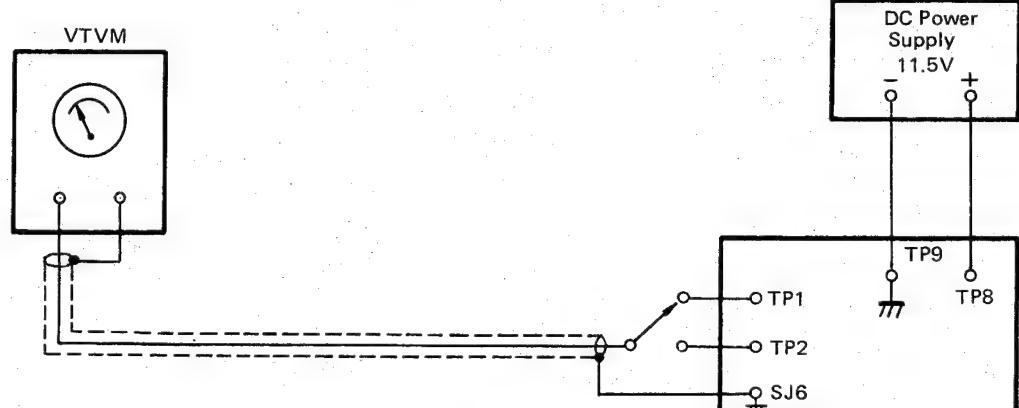


Fig. 33

Audio Circuit Board

### Alignment Procedure

- Set tape recorder to recording mode and best proof SW102 at position 2.
- Adjust VR141 and VR151 to obtain the voltage of  $+3.8mV \pm 0.2mV$ .
- Confirm VR141 and VR151 to obtain the voltage of  $+3.9mV \pm 0.3mV$  with SW102 at position 1.

**Note:** Trap coil alignment and Bias alignment interact with one another.

Repeat alignment several times to confirm correct trap coil and bias alignment.

## R/P HEAD AZIMUTH

### Preparation

1. Set up Oscilloscope and DC supply as shown in Fig. 34.

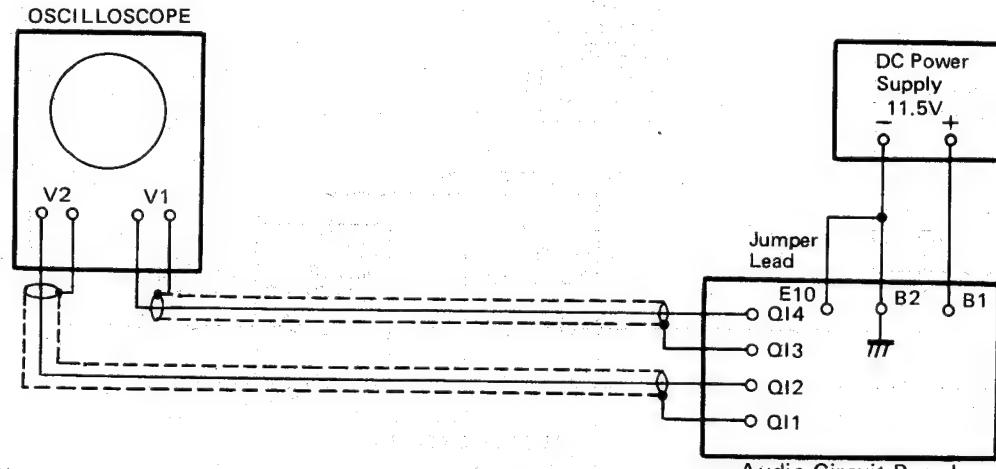


Fig. 34

### Alignment Procedure

1. Play azimuth tape (9ZZCFM).
2. Adjust screw for Maximum indication on oscilloscope when playback by the test tape.
3. Fix adjustment lock head adjustment screw with lacquer.

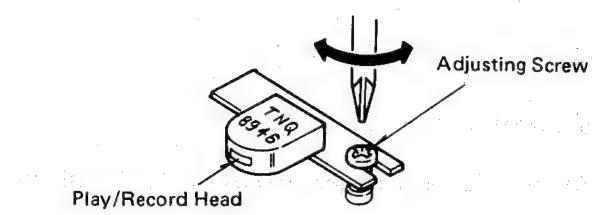


Fig. 35

# LED METER ALIGNMENT

## LED METER ALIGNMENT

### Preparation

- Set up Signal Generator and DC power supply as shown in Fig. 36.

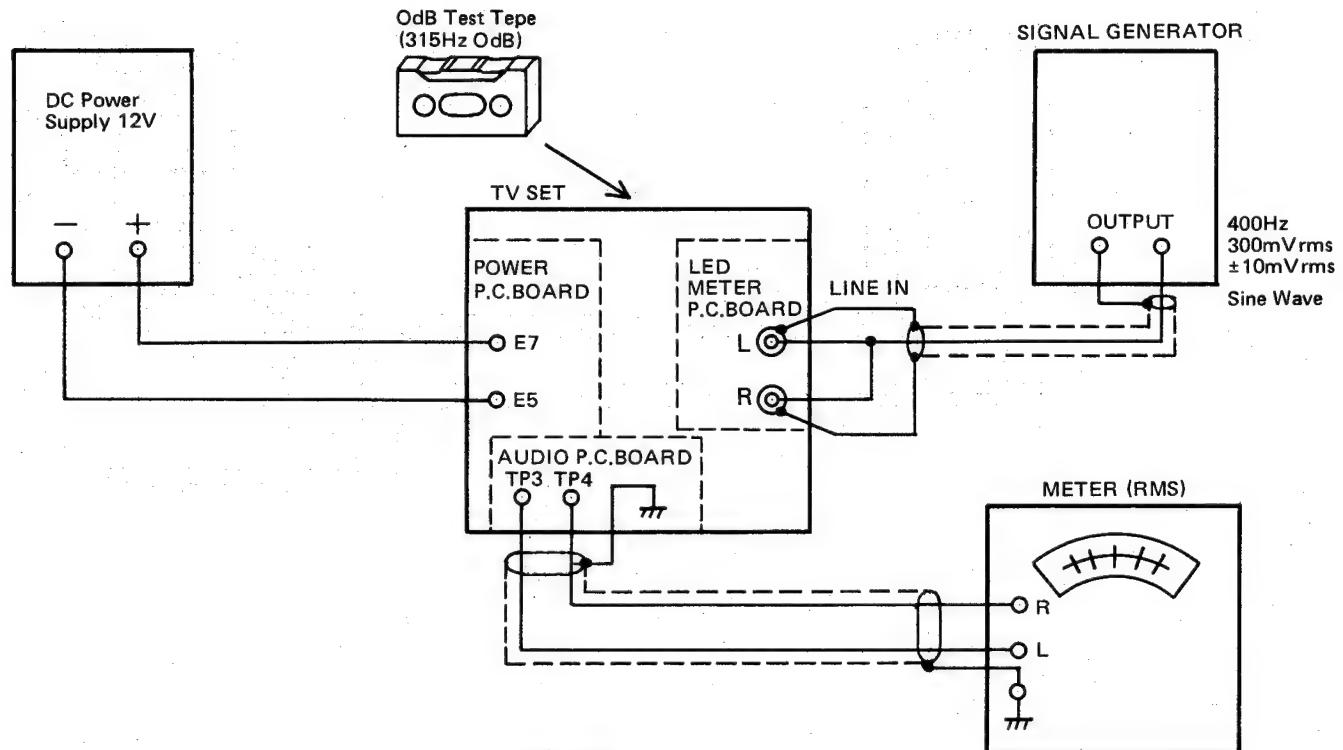


Fig. 36

### Alignment Procedure

- Set the LED meter switch (SW301) to "ON" position.
- Set the TV/Radio/Tape/Line in Selector to "TAPE" position.
- Put the test tape (9ZZCFM) and Set the tape recorder to playback mode.
- Adjust VR301 (L side) to obtain light the 5th. LED meter from left side as shown in Fig. 37.
- Adjust VR302 (R Side) to obtain light the 5th. LED meter from left side as shown in Fig. 37.

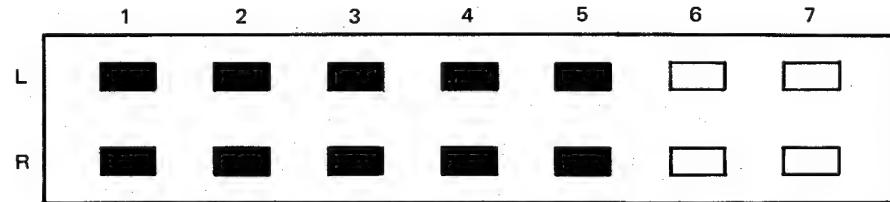
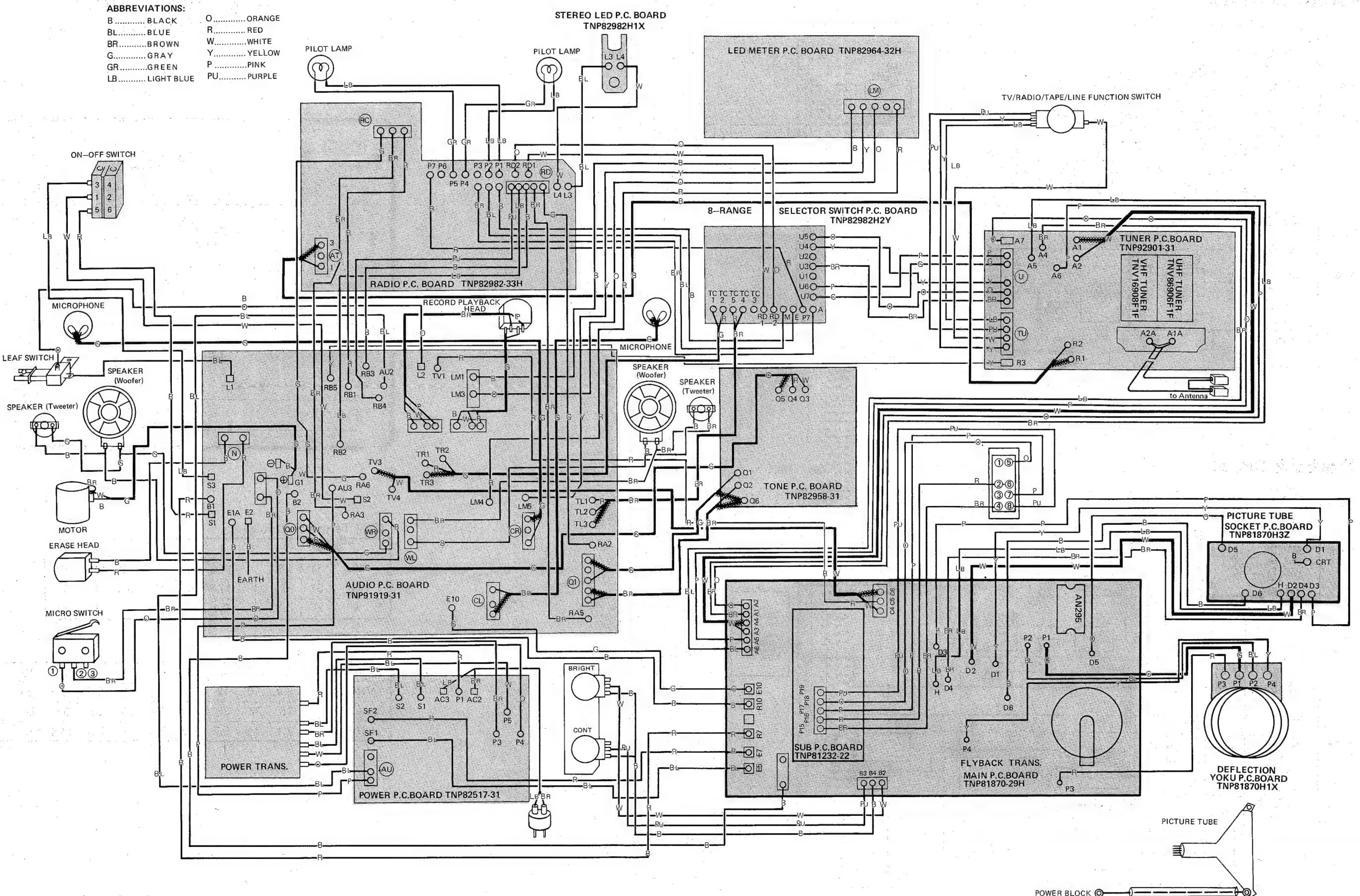


Fig. 37

## CONNECTION TABLE

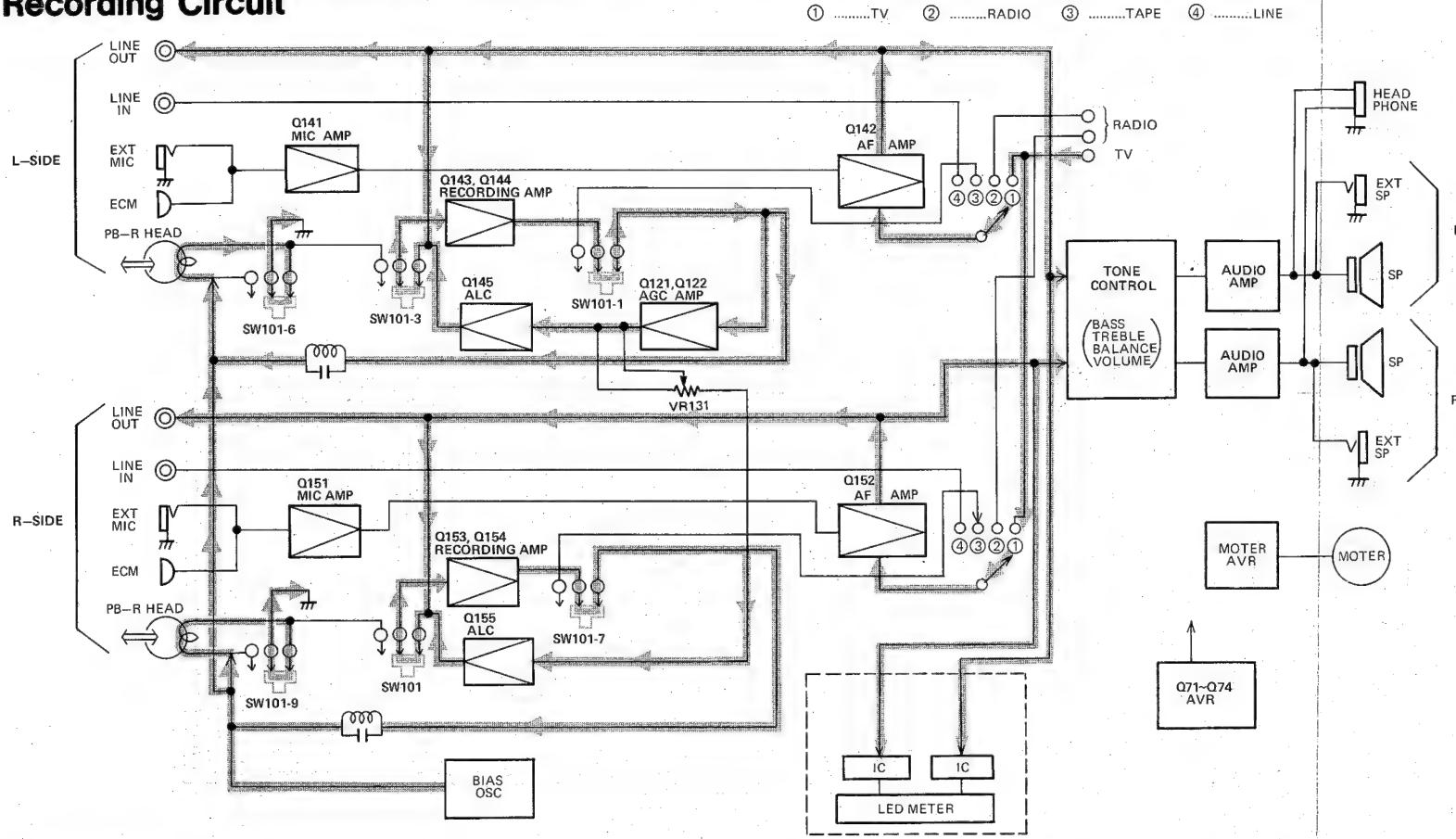
**ABBREVIATIONS:**

B.....BLACK	O.....ORANGE
BL.....BLUE	R.....RED
BR.....BROWN	W.....WHITE
G.....GRAY	Y.....YELLOW
GR.....GREEN	P.....PINK
LB.....LIGHT BLUE	PU.....PURPLE

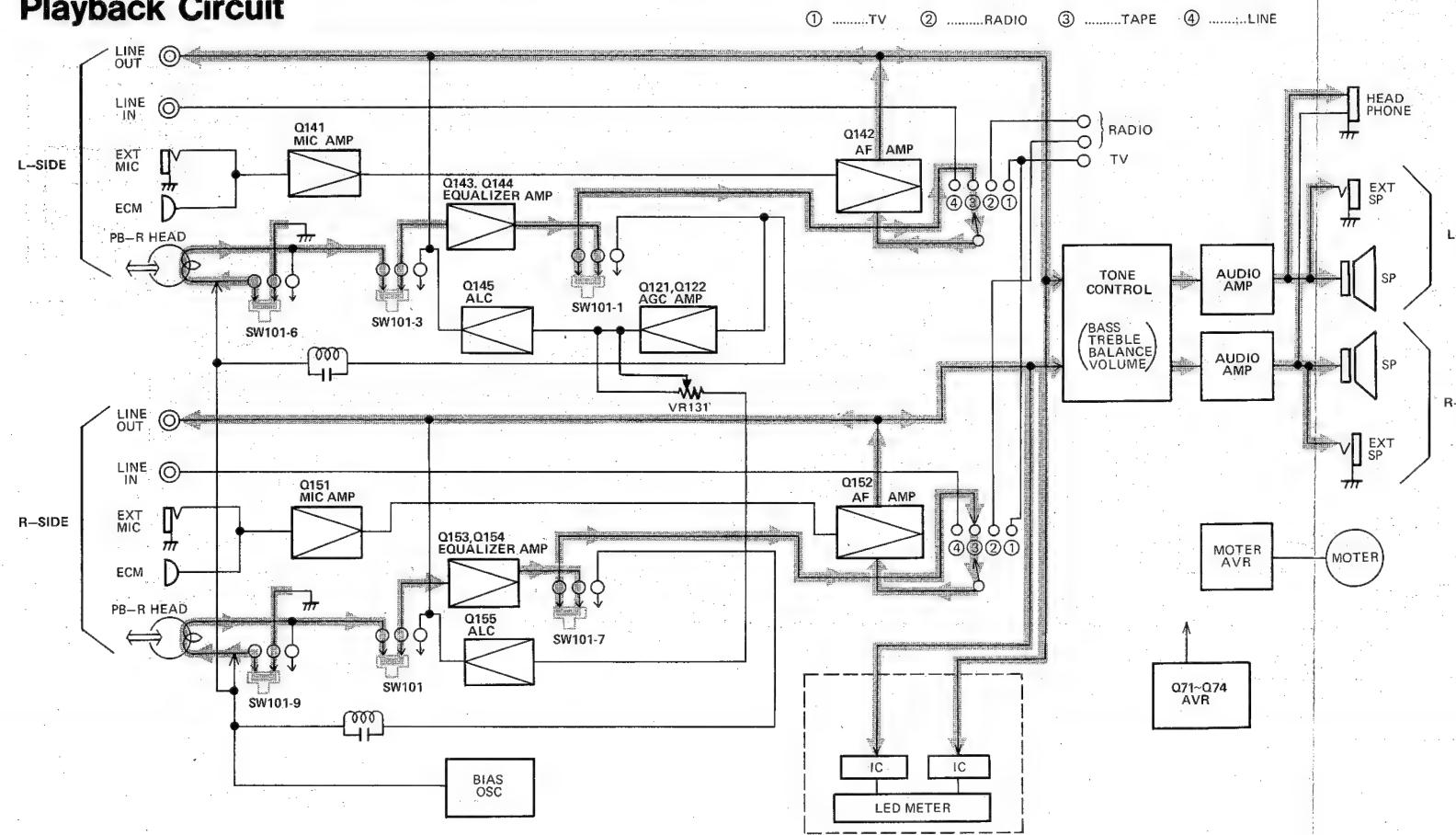


# BLOCK DIAGRAM FOR TAPE RECORDER

## Recording Circuit



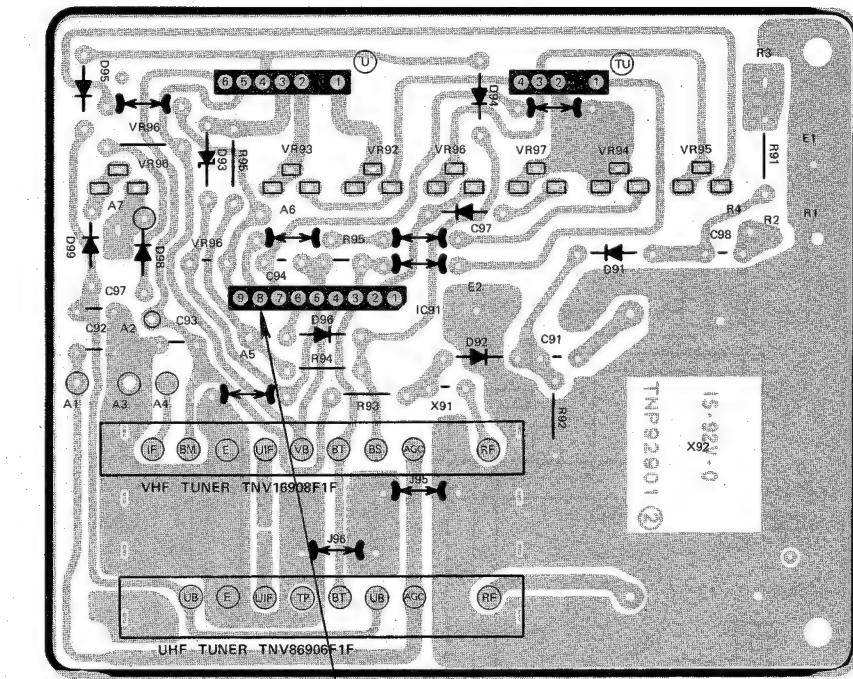
## Playback Circuit



## CONDUCTOR VIEW

### TUNER CIRCUIT BOARD

TNP82965-33



### IC91 Terminal Voltage

TV Band	Terminal No.	1	2	3	4	5	6	7	8	9
		VL	31	26		11.3	0	-7	27	32
VH	31	0		11.3	0	10	6.3	6	32	
U	27	8.3		0.4	0	-7	6.4	8	32	

### IC91 Terminal 3

Channel	1	2	3	4	5	6	7	8	9	10	11	12
VHF	0.2	3.9	10	12	17	7	8	9.3	10.5	11.6	13.2	16
Channel	21	25	30	35	40	45	50	55	60	65	69	
UHF	0.9	2.1	3.8	5.7	8.2	8.8	10.7	12.4	14.4	16.2	18	

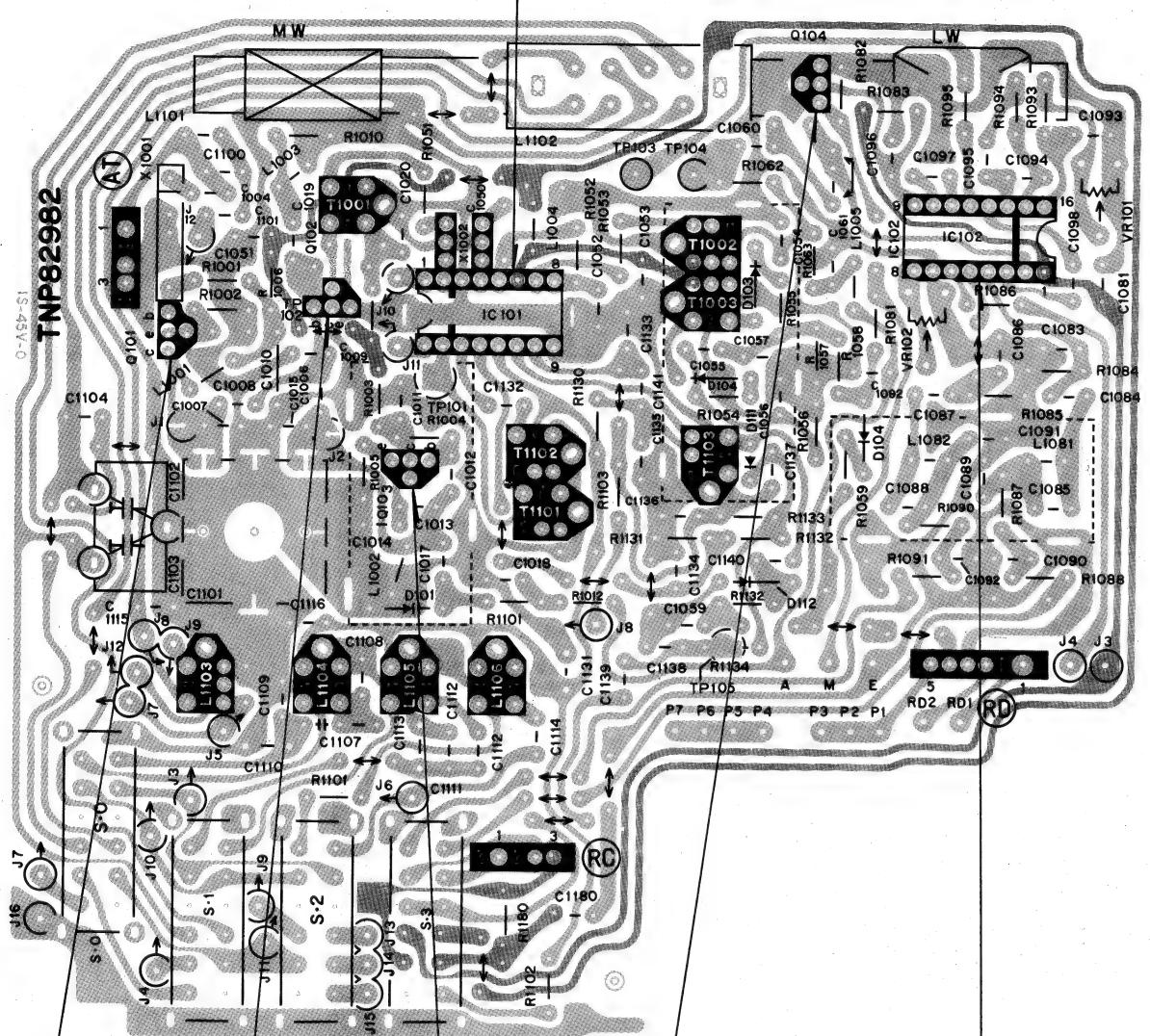
## CONDUCTOR VIEW

## RADIO CIRCUIT BOARD

TNP82982-33H

IC101

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
AM	4.8V	0V	0V	0V	0V	0V	0V	0V	0V	0.7V	4.8V	4.8V	0.7V	0.7V	4.8V	0.7V
FM	0V	0.7V	0V	2.8V	3.5V	4.6V	4.5V	3.4V	0V	0V	0V	0V	0V	0V	0V	0V



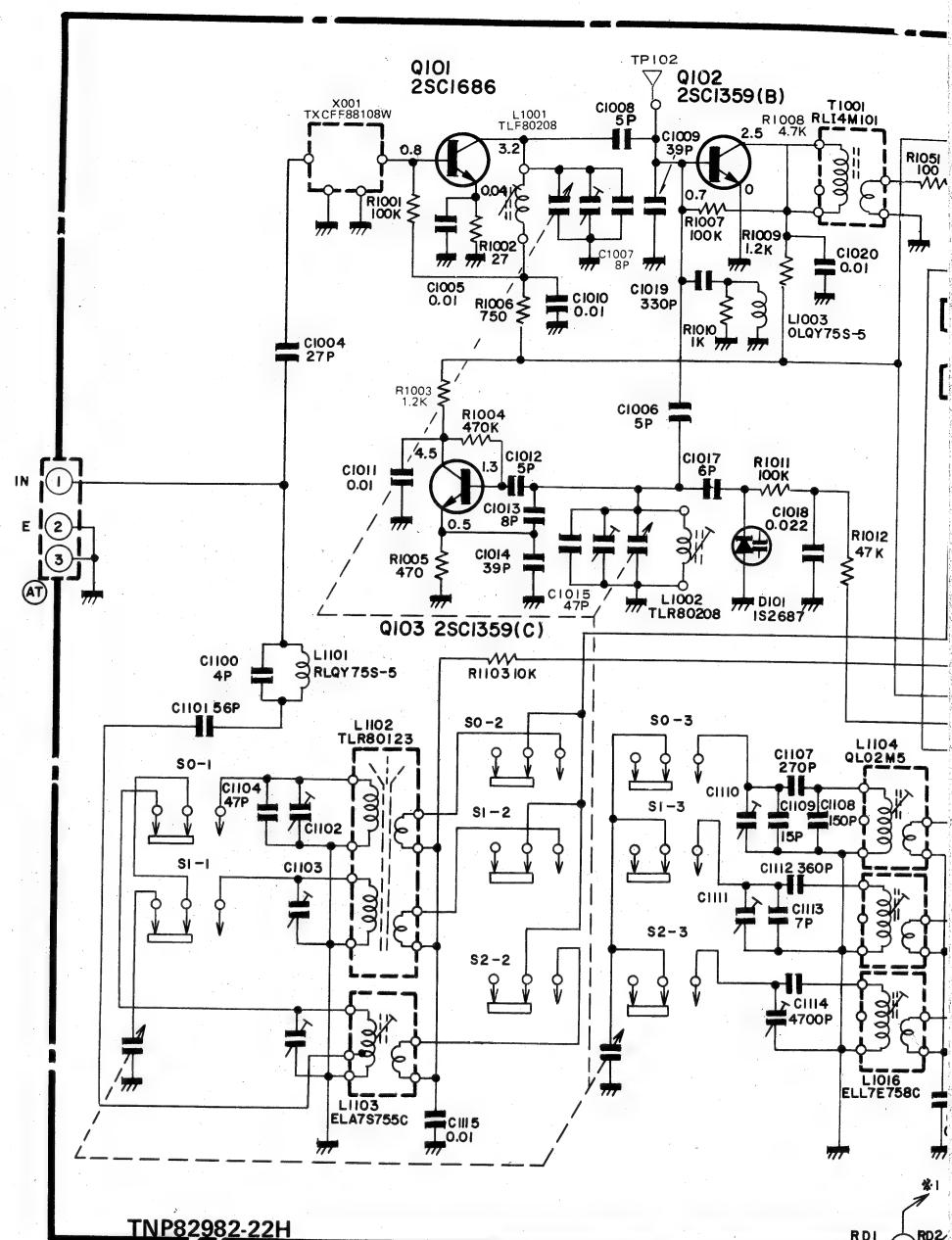
Q101		
C	3.2V	
B	0.8V	
E	0.04V	

Q102		
C	2.5V	
B	0.7V	
E	0V	

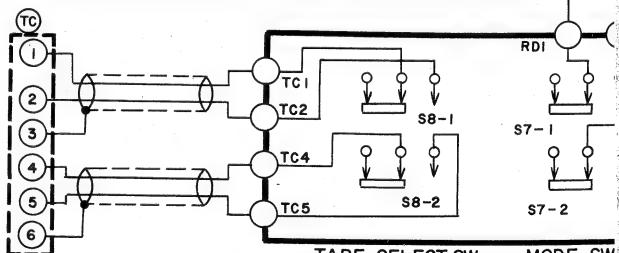
Q103		
C	4.5V	
B	1.3V	
E	0.5V	

Q104		
AM	0.03V	0.06V
B	0V	0.6V
E	0V	0V

IC102		
1	11.8V	9 0.06V
2	3.4V	10 1.7V
3	3.1V	11 1.7V
4	3.9V	12 1.4V
5	3.8V	13 1.7V
6	10.2V	14 1.7V
7	0V	15 1.7V
8	0.2V	16 2.6V



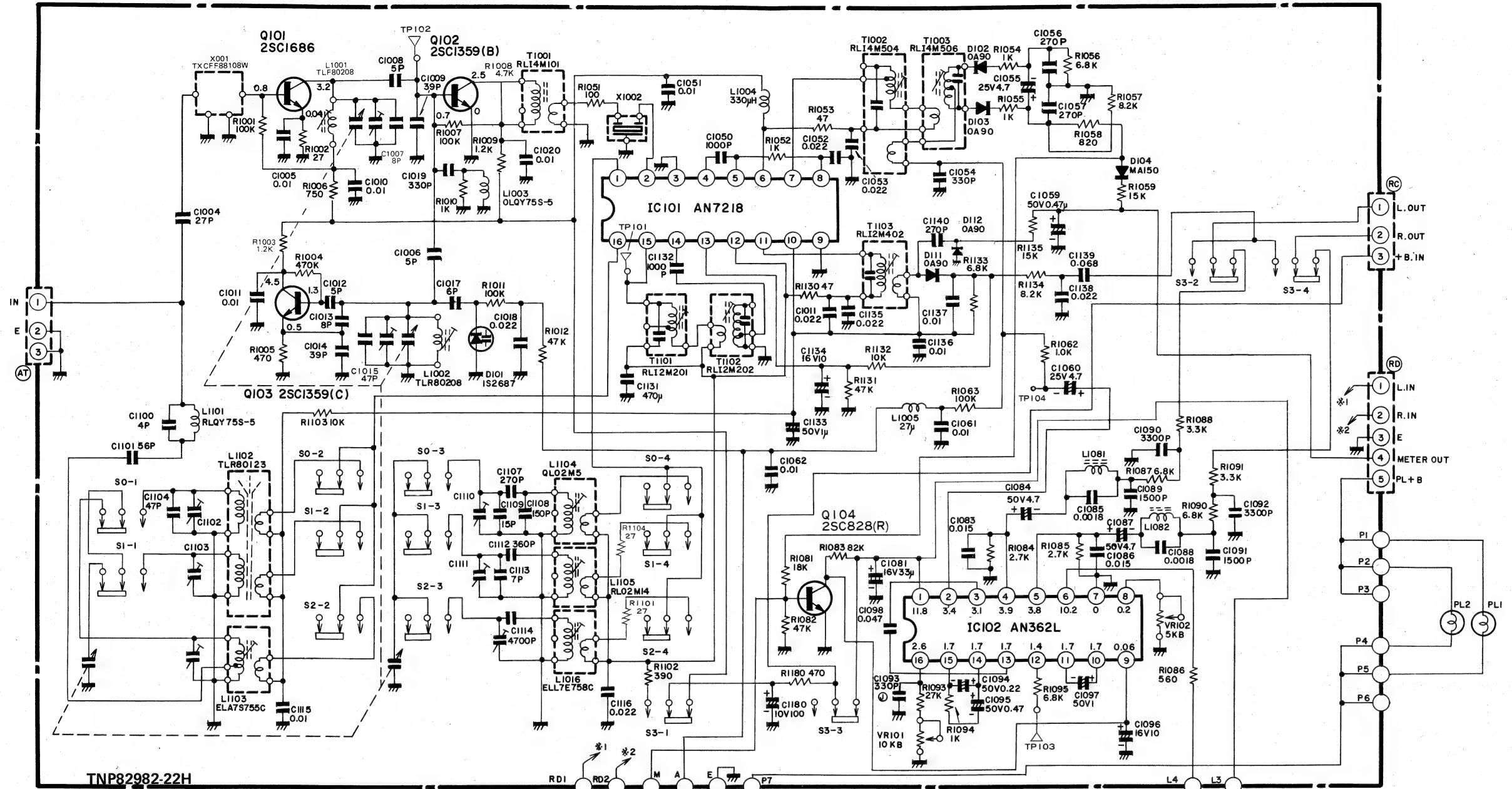
SI ~ S5 BAND SELECT SWITCH  
 S5 S4 S3 S2 SI SO  
 VHF UHF FM SW MW LW



IC101

PIN NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A M	4.8V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0.7V	4.8V	4.8V	0.7V	0.7V	4.8V
F M	0V	0.7V	0V	2.8V	3.5V	4.6V	4.5V	3.4V	0V	0V	0V	0V	0V	0V	0V	0V

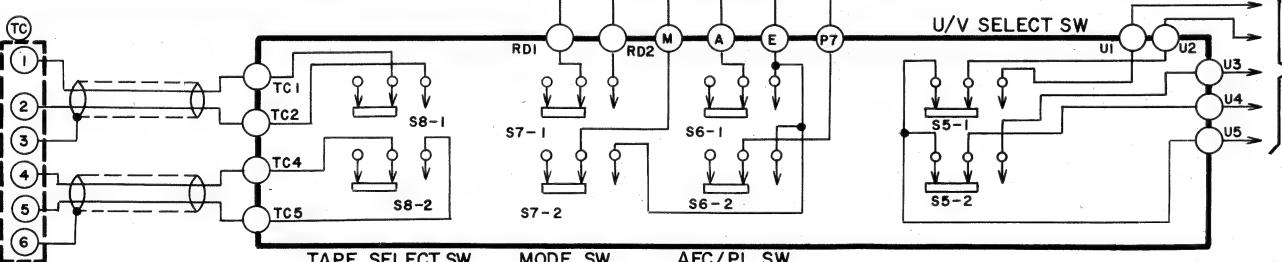
## - SCHEMATIC DIAGRAM FOR RADIO -



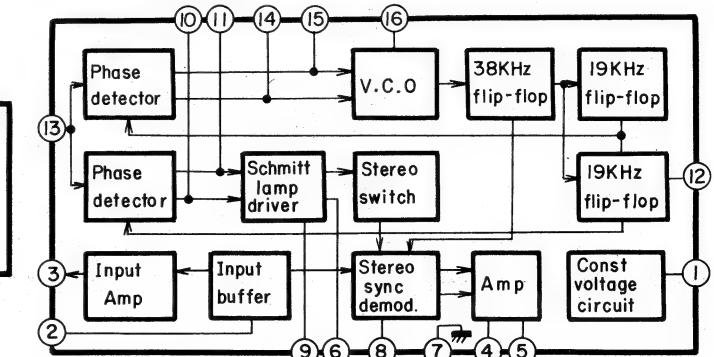
**TNP82982-22H**

SI ~ S5 BAND SELECT SWITCH

S5	S4	S3	S2	SI	SO
VHF	UHF	FM	SW	MW	LW



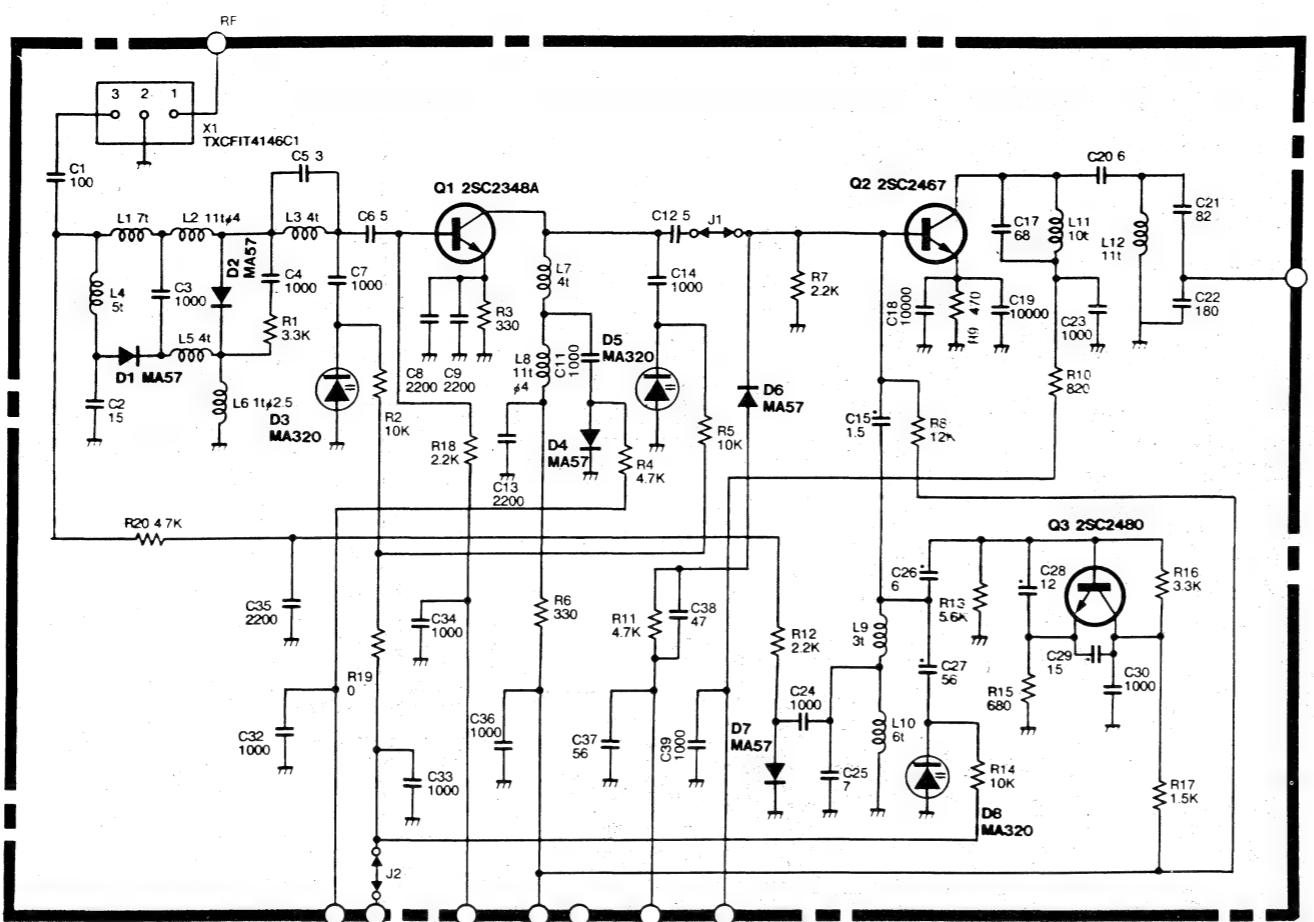
CIO2 AN362L



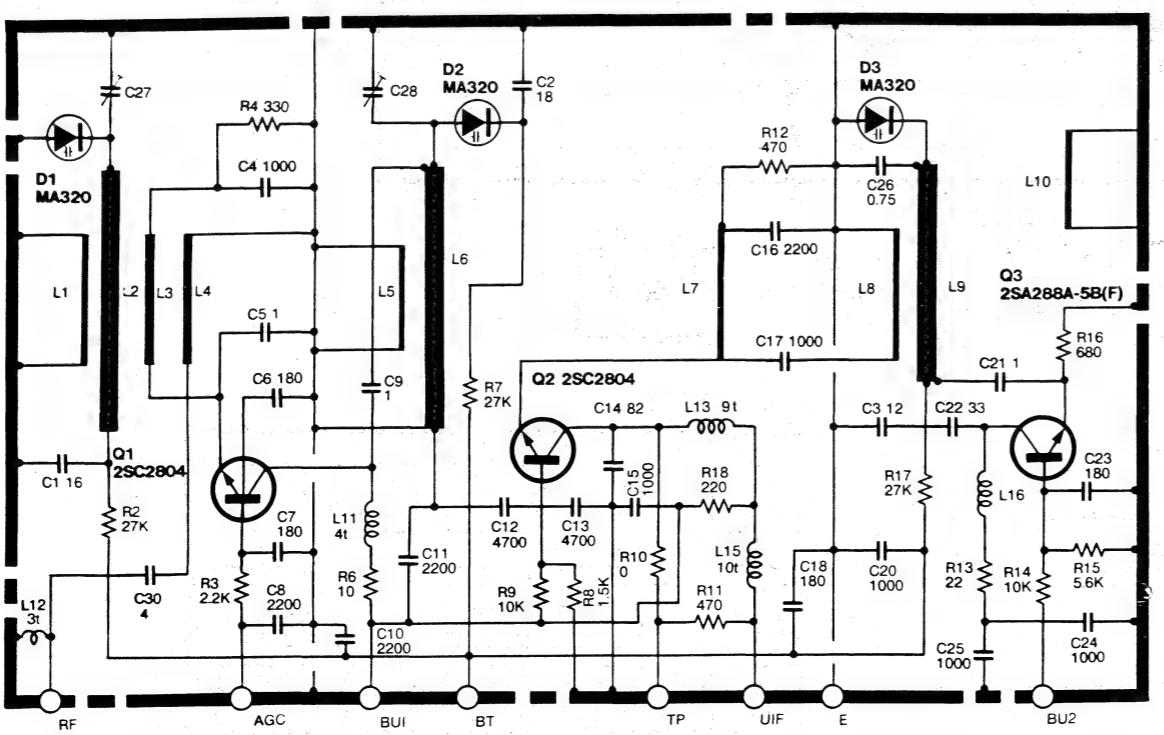
	A	M	FM
C	0.03V	0.06V	
B	O	V	0.6 V
E	O	V	O V

## **—SCHEMATIC DIAGRAM FOR TUNER—**

VHF TUNER TNV16908F1F



## **UHF TUNER TNV86906F1F**

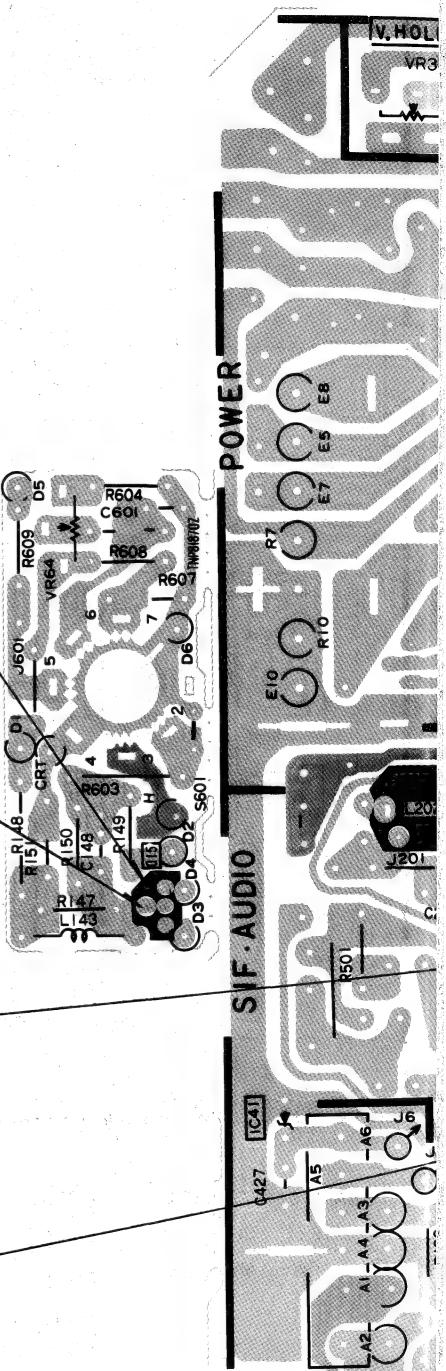


<b>Q15</b>
C 65V
B 2.8V
E 2.2V

IC51			
1		9	2.1V
2		10	2.1V
3		11	10.8V
4	0V	12	7.8V
5		13	0V
6	4.2V	14	7.1V
7	4.3V	15	
8	4.3V	16	

IC12			
1	3.9V	5	11V
2	5.2V	6	11V
3	5.2V	7	3.3V
4	3.1V	8	0V

IC11			
1	3.7V	8	11.1V
2	3.7V	9	7.5V
3	0V	10	1.6V
4	0V	11	1.1V
5	0V	12	5.1V
6	2.3V	13	6.4V
7	11.1V	14	5.6V

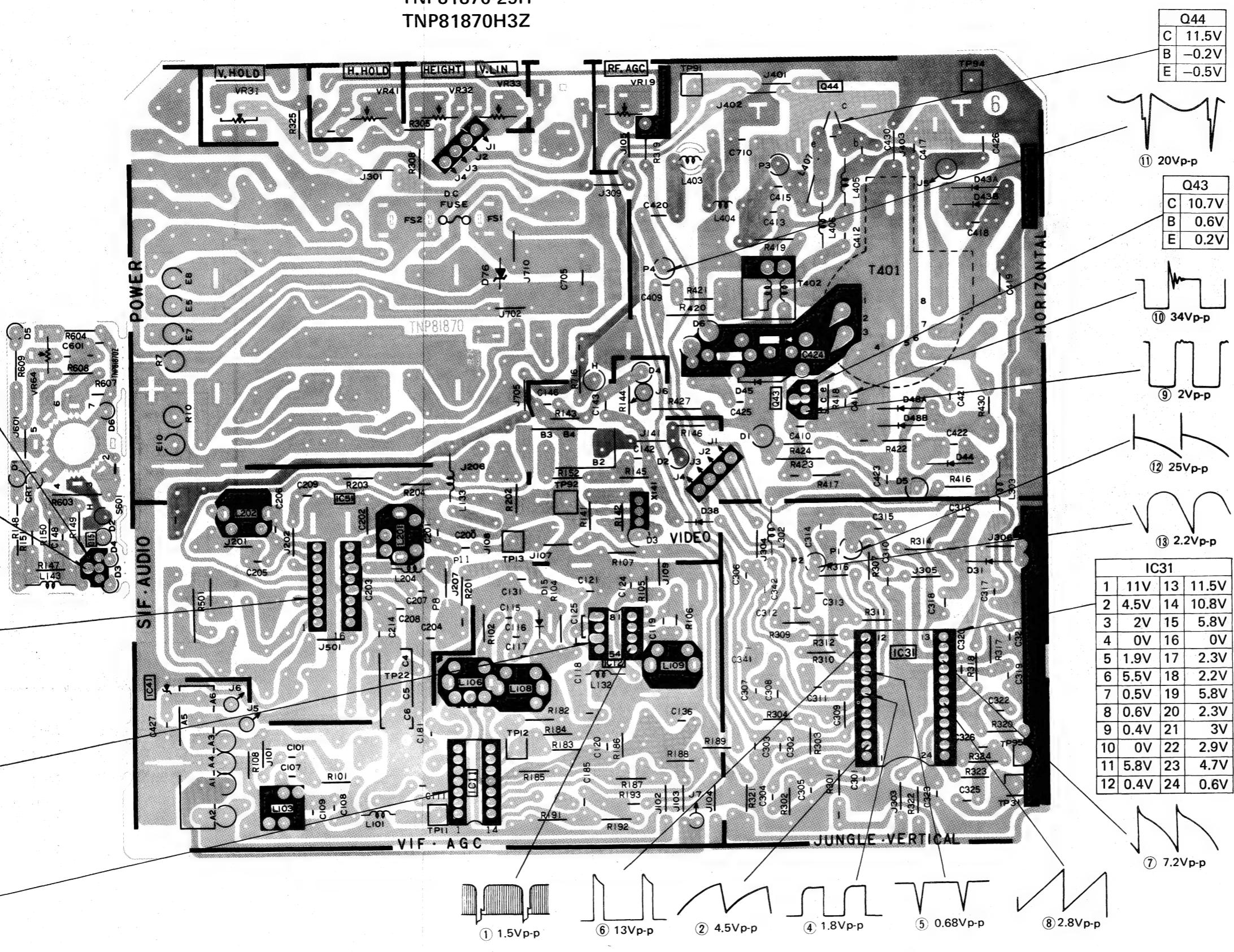


# CONDUCTOR VIEWS

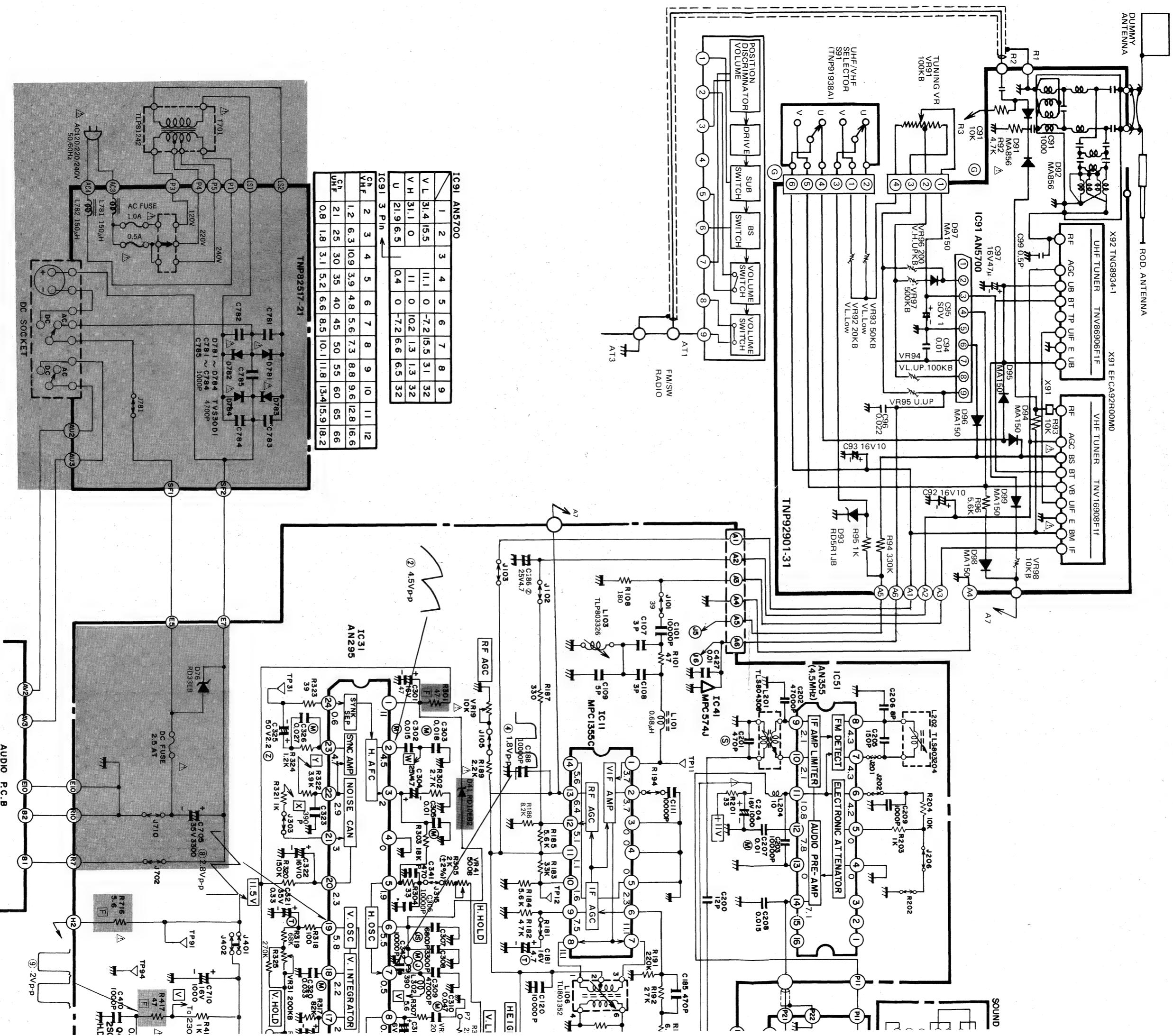
## MAIN CIRCUIT BOARD

TNP81870-29H

TNP81870H3Z



# SCHEMATIC DIAGRAM FOR MODEL TR-1230



## NOTE

### 1. RESISTOR

All resistors are carbon 1/4W resistor, unless otherwise noted the following marks.

Unit of resistance is  $\Omega$ , ( $K=1,000$ ,  $M=1,000,000$ )

$\triangle$  : Solid resistor

$\square$  : Wire wound resistor

$\square \text{---}$  : Thermistor

$\square \text{---}$  : Fuse resistor

$\square \text{---}$  : Polyester capacitor

$\square \text{---}$  : Polystyrene capacitor

### 3. COIL

Unit of inductance is  $\mu$ H.

$\square$  : Position discriminator

$\square \text{---}$  : Test point position

$\square \text{---}$  : FM/SW RADIO

$\square \text{---}$  : VHF/Low

$\square \text{---}$  : VHF/U.P.

$\square \text{---}$  : VHF/U.U.P.

$\square \text{---}$  : VHF/U.L.

### 6. NUMBER IN RED CIRCLE INDICATE

7. WHEN ARROW MARK ( $\nearrow$ ) IS INDICATED

arrow

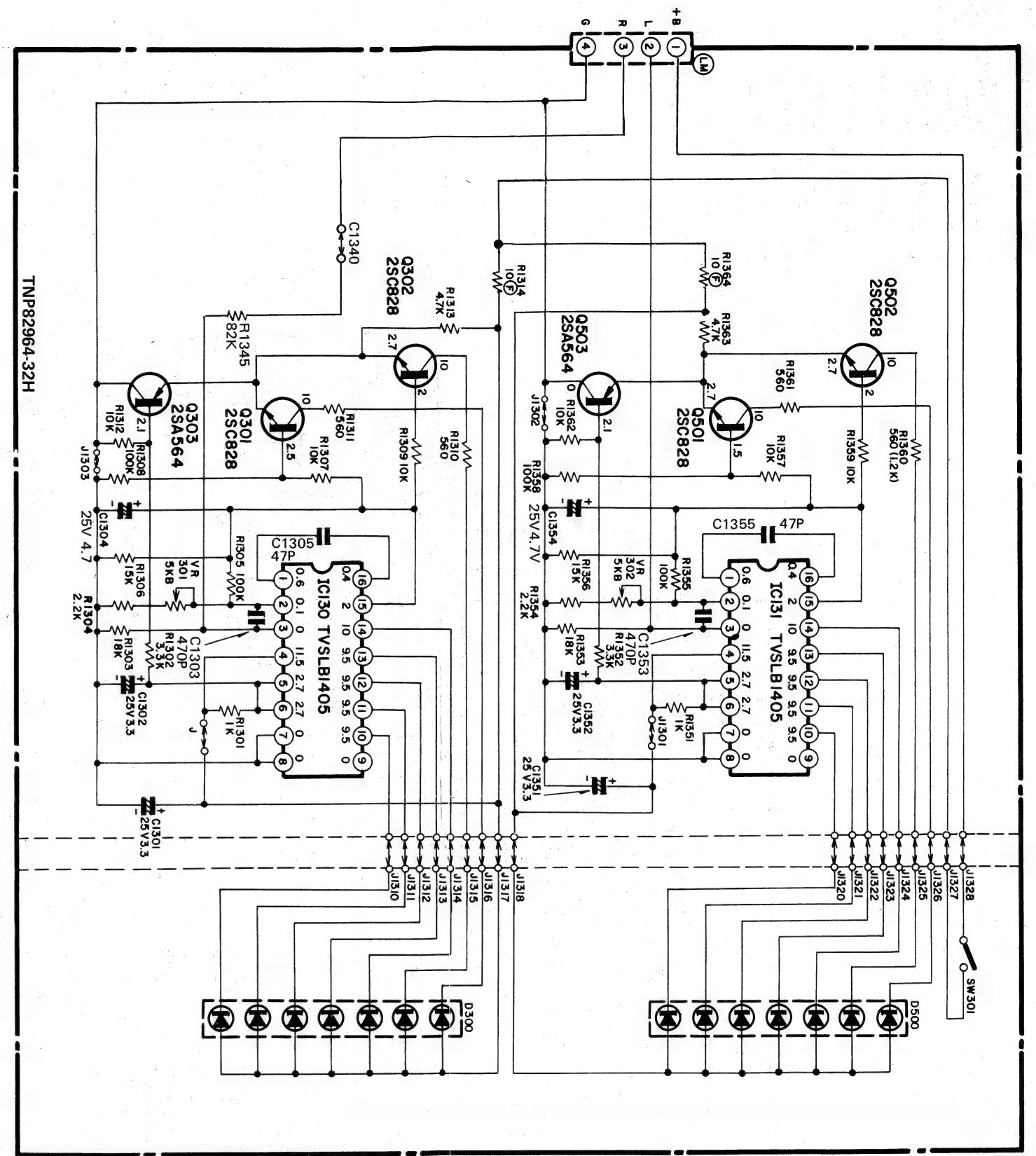
8. WHEN SCHEMATIC DIAGRAM

WITH DOTTED LINE ( $-.-$ ).

9. THIS SCHEMATIC DIAGRAM IS

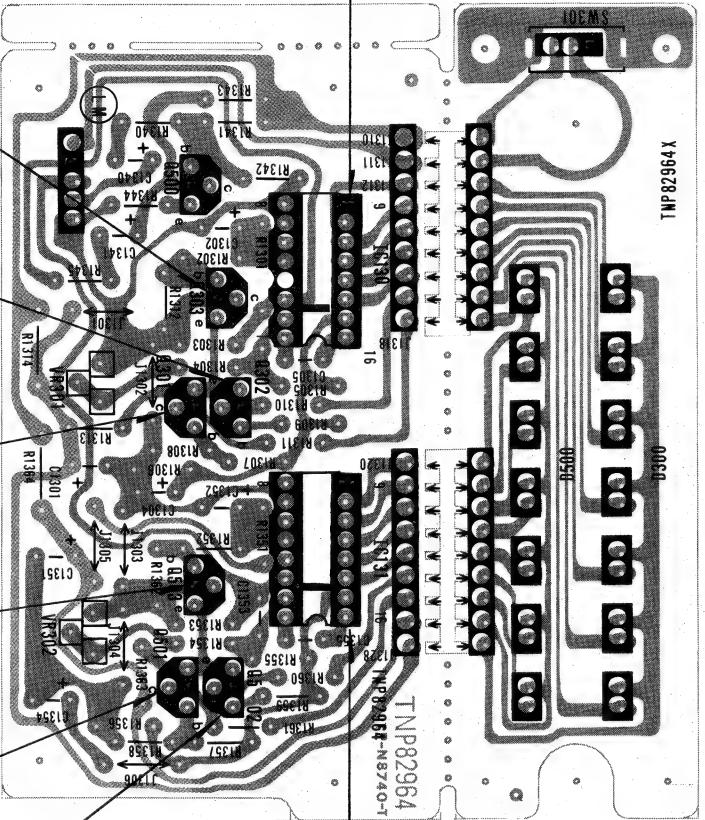


## SCHEMATIC DIAGRAM FOR IED METER



# LED METER CIRCUIT BOARD

## TNP82964-32H



IC130			
1	0.6V	9	0V
2	0.1V	10	9.5V
3	0V	11	9.5V
4	11.5V	12	9.5V
5	2.7V	13	9.5V
6	2.7V	14	10V
7	0V	15	2V
8	0V	16	0.4V

Q303

Q302

Q301

Q503

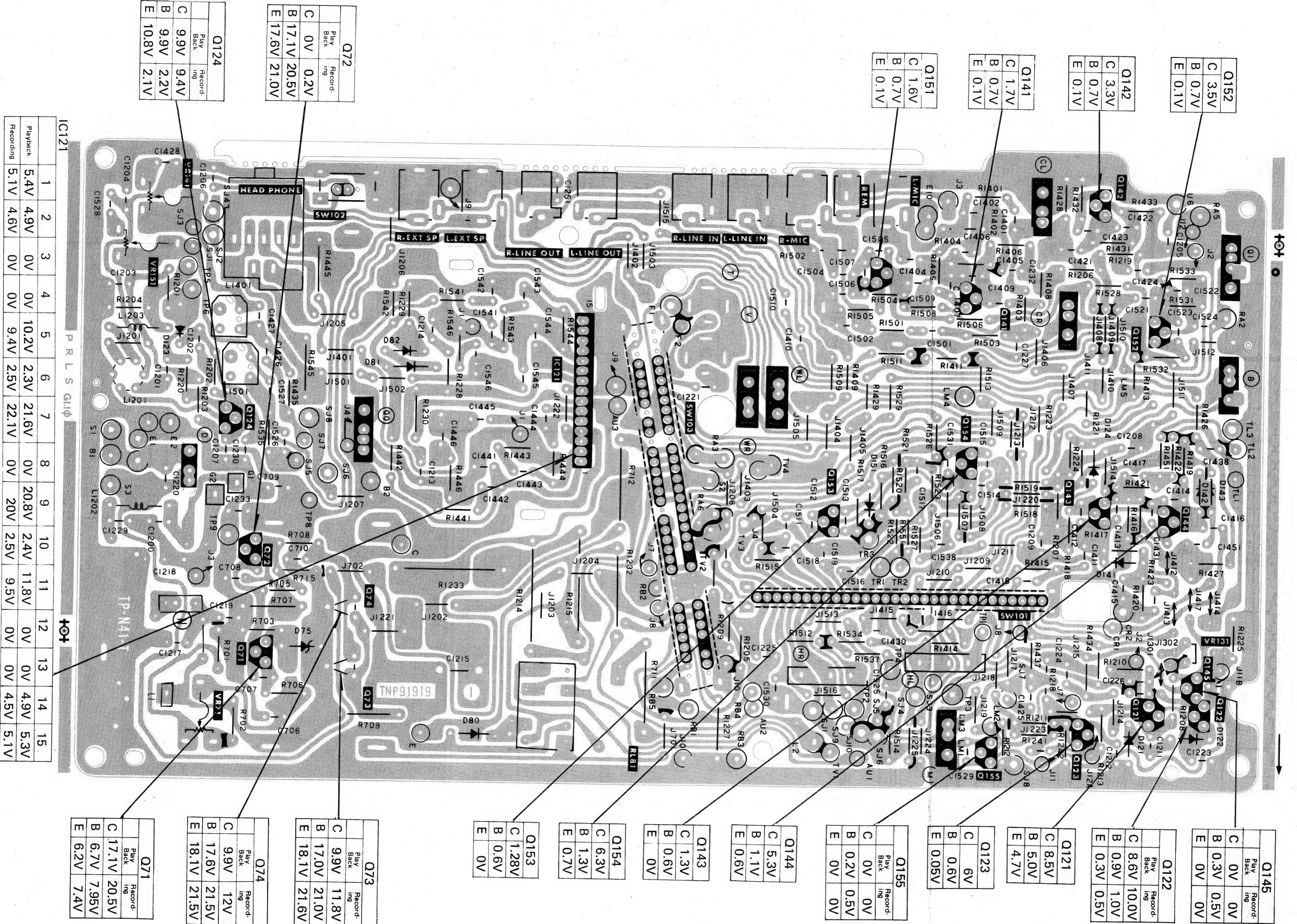
Q501

C	10V
B	2.5V
E	2.7V

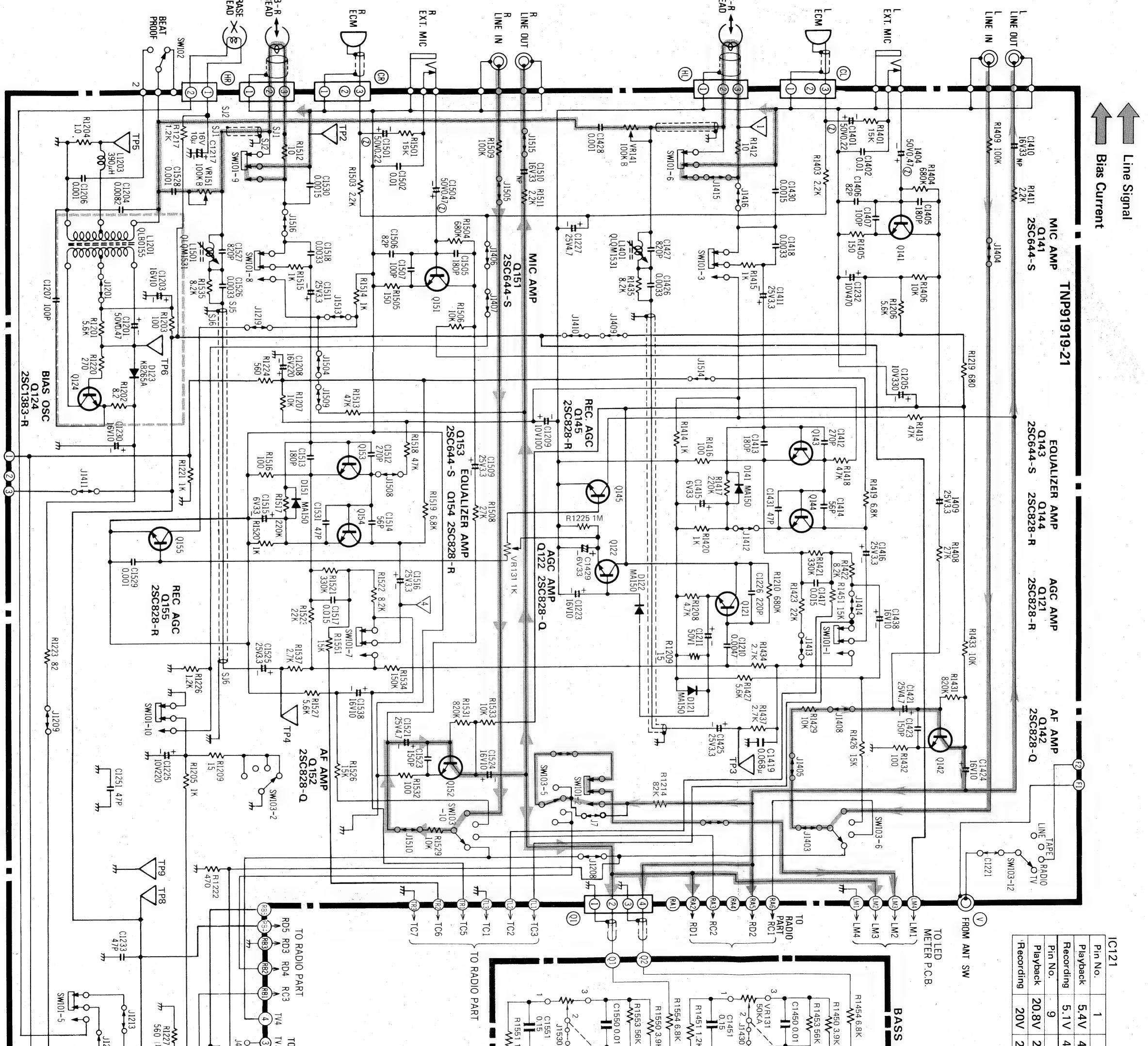
**Q502**

IC131			
	1	0.6V	9
	2	0.1V	10
3	0V	11	9.5V
4	11.5V	12	9.5V
5	2.7V	13	9.5V
6	2.7V	14	10V
7	0V	15	2V
8	0V	16	0.4V

**CONDUCTOR VIEWS**  
**AUDIO CIRCUIT BOARD**  
**TNP91919-21**



## -SCHEMATIC DIAGRAM FOR

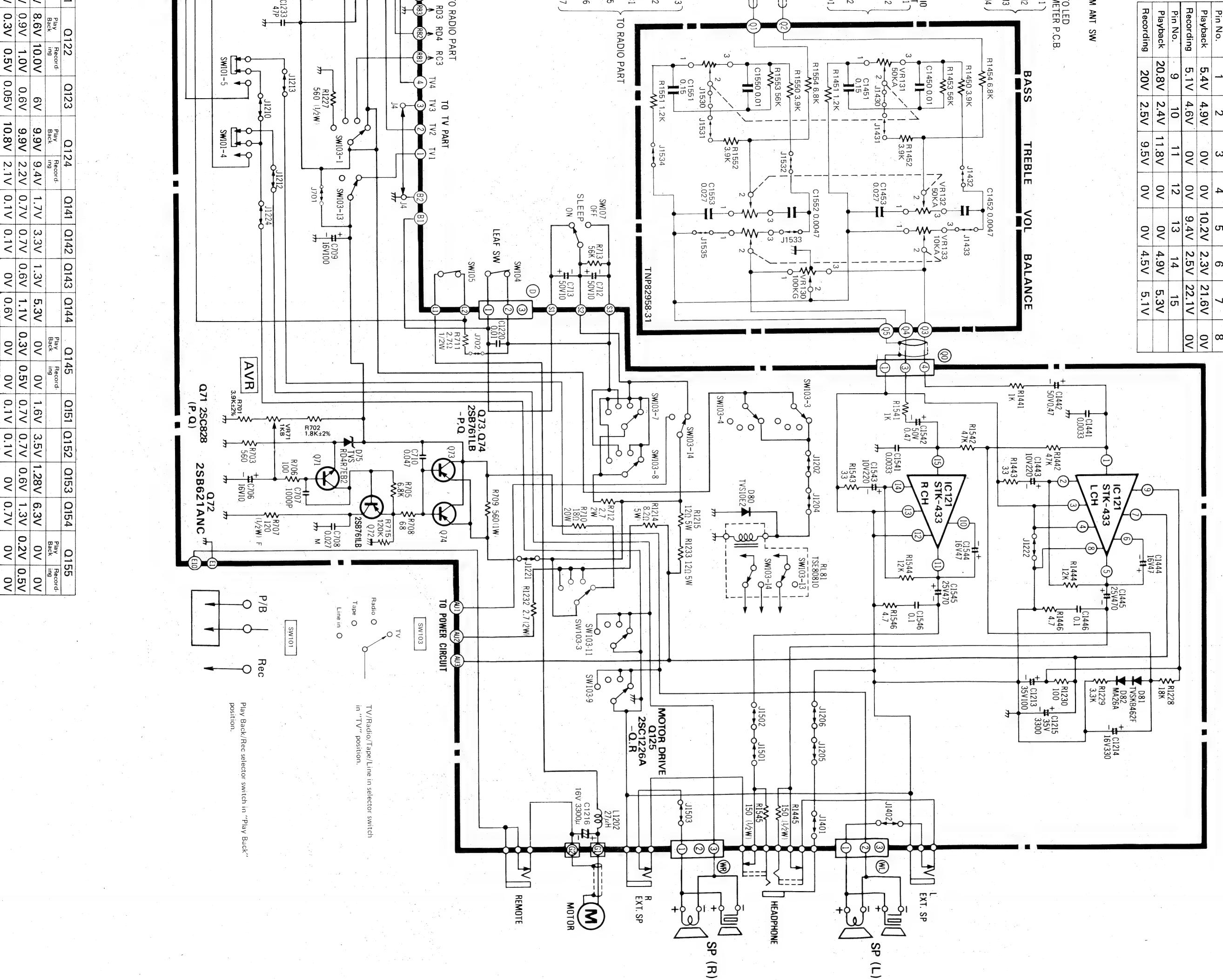


A large, thick, solid black arrow pointing upwards.

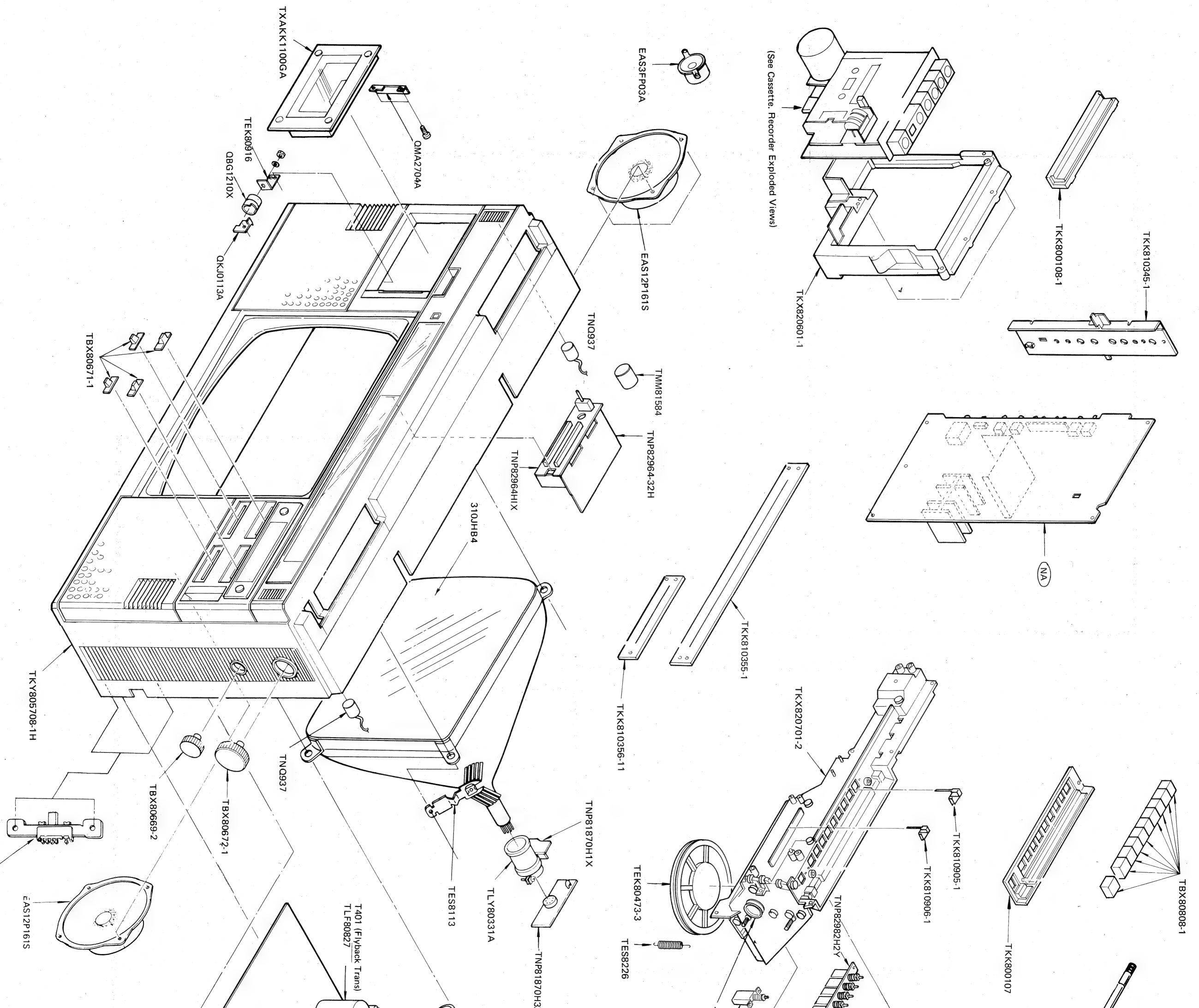
IC121			
Pin No.	1	2	3
Playback	5.4V	4	-
Recording	5.1V	4	-
Pin No.	9	-	-
Playback	20.8V	2	-

071	072	073	074	Q121	Q122	Q123
Play Record- ing	Play Back	Play Record- ing	Play Record- ing	Play Record- ing	Play Record- ing	Play Record- ing
C 17.1V	20.5V	0V	0.2V	9.9V	11.8V	9.9V
B 6.7V	7.95V	17.1V	20.5V	17.0V	21.0V	17.0V
F 6.2V	7.4V	17.6V	21.0V	18.1V	21.6V	18.1V

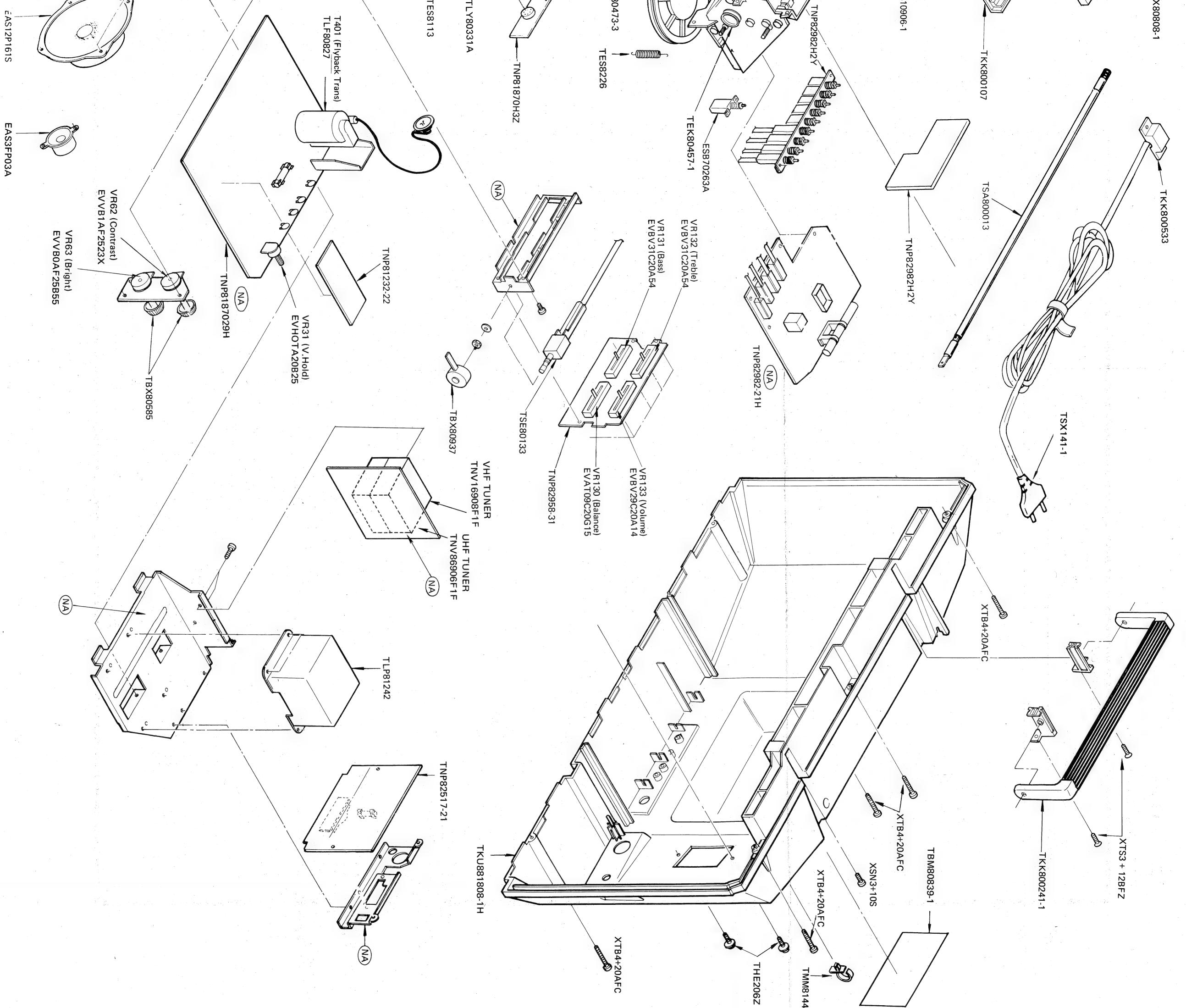
# GRAM FOR AUDIO



TELEVISION EXPLORER



# IN EXPLODED VIEWS

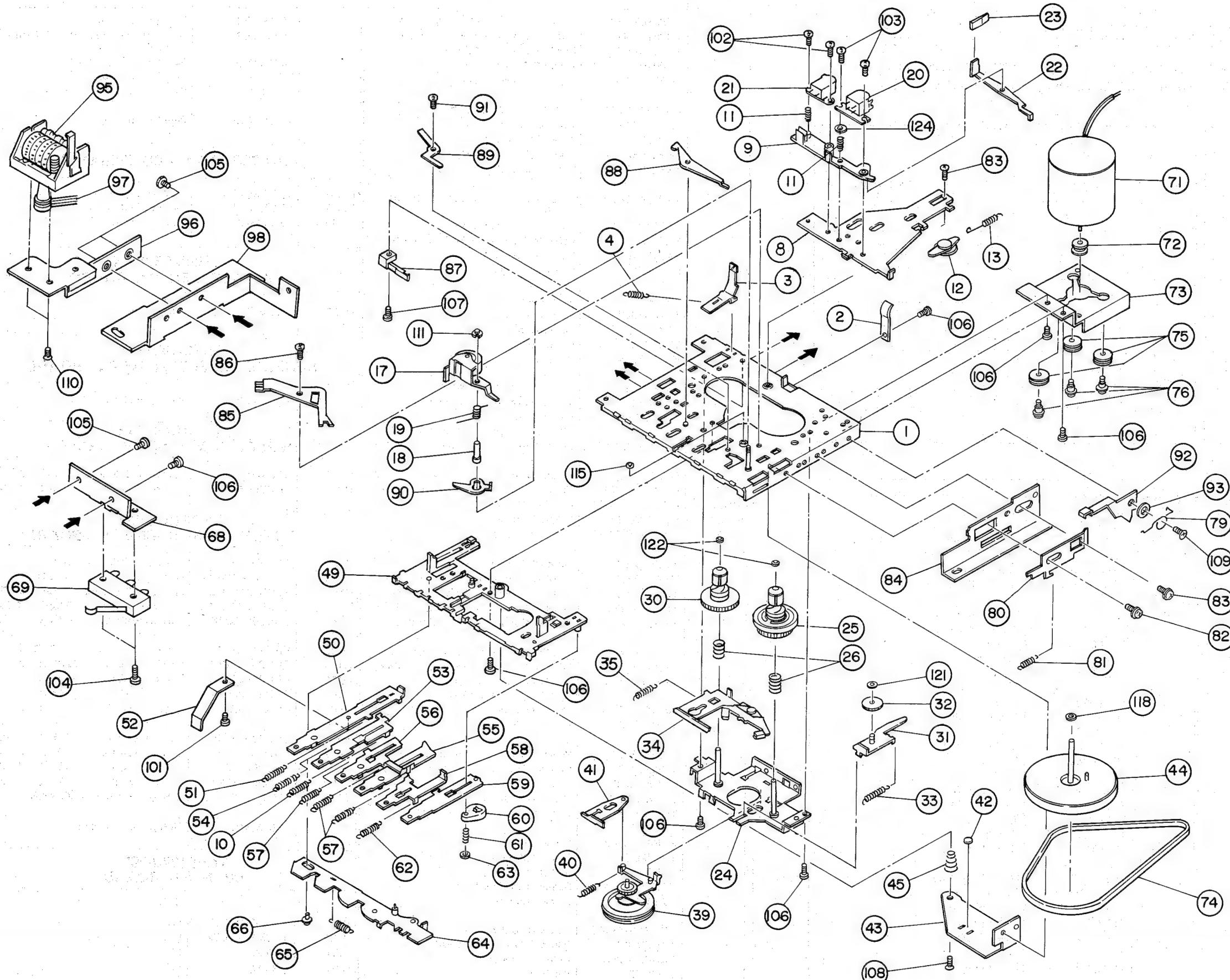


**NOTE:** Parts or Components marked with **(NA)** and unlisted are not available as a replacement parts.

# CASSETTE RECORDER EXPLODED VIEWS

## CASSETTE MECHANISM REPLACEMENT PARTS LIST

Note: (1) NA Mark: Non available Parts.  
(2) SMQ Part: TSD Supply Parts.



Ref. No.	Part No.	Description
①	(MA)	Chassis Ass'y
②	SMQ3944	Pack Spring
③	SMQ3892	Record Safety Lever (with Spring)
④	(NA)	Record Safety Lever Spring
⑤	SMQ3900	Head Panel (with Sensing Plate, Sensing Cap)
⑥	SMQ3894	Head Base (with Head Spring)
⑦	SMQ3896	RC Spring
⑧	SMQ3898	Head Spring
⑨	SMQ3902	Take up Roller Ass'y (with Spring)
⑩	(NA)	Take up Roller Safety Spring
⑪	SMQ3904	Pinch Roller Ass'y. (with Arm Sleeve Spring)
⑫	(NA)	Pinch Roller Arm Sleeve
⑬	(NA)	Pinch Roller Spring
⑭	TNQ8946	Play Record Head
⑮	TNQ8938	Erase Head
⑯	(NA)	Sensing Plate
⑰	(NA)	Sensing Cap
⑱	(NA)	Reel Rest Ass'y
⑲	SMQ3906	Take up Reel Ass'y
⑳	(NA)	Spring
㉑	SMQ3910	Supply Reel Ass'y
㉒	SMQ3916	F.F. Idler Arm Ass'y (with Center Gear)
㉓	(NA)	Center Gear
㉔	SMQ3918	F.F. Gear Plate Spring
㉕	SMQ3922	Main Plate Ass'y
㉖	(NA)	Main Plate Spring
㉗	SMQ3926	RF Clutch Ass'y
㉘	SMQ3928	RF Clutch Arm Spring
㉙	SMQ2538	Rwd Spring
㉚	(NA)	Flywheel Plate
㉛	SMQ3930	Flywheel Holder
㉜	SMQ3932	Flywheel Capstan
㉝	(NA)	Spring
㉞	SMQ3956	Push Button Base
㉟	SMQ3958	Record Button Lever Ass'y
㉟	TES8191	Record Spring (Storer)
㉟	SMQ3960	Play Button Lever Ass'y
㉟	SMQ3962	Play Button Lever Spring
㉟	SMQ3964	F.F. Button Lever Ass'y
㉟	SMQ3966	Rwd. Button Lever Ass'y
㉟	SMQ3968	Button Lever Spring
㉟	TUX80558	Stop Button Lever
㉟	SMQ3972	Pause Button Lever Ass'y
㉟	SMQ2444	Pause Lever
㉟	SMQ3976	Pause Lever Spring
㉟	SMQ3974	Pause Lever Spring
㉟	SMQ3978	Pause Lever Stopper
㉟	SMQ3940	Push Button Actuator Ass'y
㉟	(NA)	Push Button Actuator Spring
㉟	TSE80607	Actuator Shaft (B)
㉟	MMT35F2BJ	Switch Bracket
㉟	TNQ8948	Micro Switch
㉟	(NA)	Motor
㉟	TMM82514	Motor Pulley
㉟	SMQ1834	Motor Bracket
㉟	SMQ1908	Main Belt
㉟	TES8245	Motor Rubber
㉟	TUX80564	Special Screw (S)
㉟	TES8246	Eject Kick Lever Spring (H)
㉟	SMQ3952	Eject Slide Lever
㉟	SMQ3950	Eject Slide Lever Spring (V)
㉟	TUX80547	Eject Special Screw
㉟	SMQ3982	Special Screw
㉟	SMQ3984	Eject Bracket
㉟	TSE80916	Arm Lever
㉟	(NA)	Arm Lever Special Screw
㉟	(NA)	Reef Switch
㉟	(NA)	RC Kick Lever
㉟	(NA)	Center Lever
㉟	(NA)	Arm Lever (A)
㉟	SMQ3984	Special Screw
㉟	TUX80565	Eject Kick Lever
㉟	TNQ8939-1	Eject Kick Lever Collar
㉟	(NA)	Counter
㉟	TMM82515	Counter Bracket
㉟	(NA)	Counter Belt
㉟	XSN2+4	Side Bracket (L)
㉟	XSN2+8	Screw (M2 x 4)
㉟	XSN2+7	Screw (M2 x 8)
㉟	XSN2+10	Screw (M2 x 7)
㉟	XSN26+5	Screw (M2 x 10)
㉟	XSN26+4	Screw (M2.6 x 5)
㉟	XSN26+5	Screw (M2.6 x 4)
㉟	XSN26+12	Screw (M2.6 x 5)
㉟	XSS26+8	Screw (M2.6 x 12)
㉟	XSS3+6S	Screw (M2.6 x 8)
㉟	XUC2FT	Screw (M2.6 x 6)
㉟	SMQ1402	Screw (M3 x 6)
㉟	SMQ3934	E. Ring
㉟	XWE12	Nylon Washer (1.8 x 5 x 10.3)
㉟	SMQ3914	Nylon Washer (2.05 x 4 x 10.5)
㉟	XWE2	Washer (1.2 x 3 x 10.25)
㉟		Washer (1.6 x 3.8 x 10.3)
㉟		Washer (2.1 x 5 x 10.4)

## **REPLACEMENT PARTS LIST**

Important Safety Notice

Components identified by the International symbol  have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

**Note:** TNP81870-29H (MAIN P.C.BOARD), TNP91919-21 (AUDIO.P.C.BOARD), TNP92901-31 (TUNER P.C. BOARD) and TNP82982-22H (RADIO P.C. BOARD) are not available as a complete printed circuit board.

#### - Resistor Numbering System -

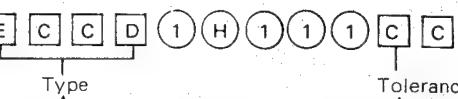
**Example:**



Symbol	Type	Symbol	Tolerance
ERD	Carbon Film	F	±1%
ERC	Solid	J	±5%
ERG	Metal Oxide Film	K	±10%
TRF	Non Flame	M	±20%
		C	±2%

## **Capacitor Numbering System —**

example:



Symbol	Type	Symbol	Tolerance
ECCD	Temperature Compensating Ceramic	C	$\pm 0.25\text{pF}$
ECKD	High Dielectric Constant Ceramic	D	$\pm 0.5\text{pF}$
ECQM	Polyester	F	$\pm 1\text{pF}$
ECEA		J	$\pm 5\%$
ECET	Electrolytic	K	$\pm 10\%$
ECSF		P	+100% -0%
ECSZ	Tantalum	Z	+80% -20%
TCSZ			
ECFW	Magnetic Semiconductor		
ECQS	Styrol		

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CABINET AND CHASSIS PART</b>					
	TKY805708-1H	Front Cabinet Ass'y		TBX80669-2	TV Tuning Knob
	TKU881808-1H	Rear Cover Ass'y		TBX80937-1	Knob TV/Radio Tape/Line Selector
	TKK800533	Cord Holder		TBX80671-1	Slide Knob
	TKK800108-1	Cassette Knob Dish		TBX80585	Rear Knob
	TKK810345-1	Line Terminal Board		TBX80949-1	Cassette Knob (A)
	TKK809384-1	TV Indicator Plate (With Front Cabinet)		TBX80950-1	Cassette Knob (B)
	TKK810915	Rive (With Front Cabinet)		TBX80951	Cassette Knob (C)
	TKK810902-2	TV Transparency Plate (With Front Cabinet)		TEK80457-1	TV Pulley
	TKK800241-3	Handle Complete		TEK80473-3	Radio Pulley
	TKK800107-1	Radio Knob Dish		TEK80916	Damper
	TKK810355-1	Radio Indicator		TEK80201	Roller (Big)
	TKK810356-11	TV Indicator		TEK80202	Roller (Small)
	TKK810903	Radio Reflection Plate		TEK80438	Shaft
	TKK810905-1	Radio Dial Guide		TEK80439	Radio Tuning Shaft
	TKK810906-1	TV Dial Guide		TEK80446	Roller Shaft
	TKK810916	TV Reflection Plate		TEK80491	TV Tuning Shaft
	TXAKK11200GA	Cassette Cover Complete		TES8113	Spring (CRT)
	TKX810701	Cassette Cover Holder		TES8191	Spring
	TKX820601-1	Cassette Bracket		TES8226	Coil Spring
	TKX820701-2	Radio Bracket		TMM81447	Cord Hook
	TKP8055033	Chassis Cover		TMM81584	Microphone Rubber
	TBM80839-1	Model Plate		△ XBA1C05NS5	Fuse (AC) 0.5A
	TBX80808-1	Push Knob		△ XBA1C10NS5	Fuse (AC) 1A
	TBX80672-1	Radio Tuning Knob		△ 310JHB4	Picture Tube
				△ TLP81242	Power Trans.
				△ TLY80331A	Deflection Yoke

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	TNP81870H3Z TNP81870H1X TNP82517-21 TNP91919-21 TNP82958-31	Picture Tube Socket P.C. Board Ass'y Deflection Yoke P.C. Board Ass'y Power P.C. Board Ass'y Audio P.C. Board Ass'y Tone P.C. Board Ass'y		TQB811587 TQB810587 TQB62996 TOE616 TQD8118155	Fun Bag TR1230X (Instruction) Book TR1230X (In Fun Bag) SS Seet (In Fun Bag) Bag (In Fun Bag) Warranty Card (In Fun Bag)
	TNP82964-32H TNP82964H1X TNP92901-31 TNP82982-22H TNP82982H1X	Led Meter P.C. Board Ass'y Led P.C. Board Ass'y Tuner P.C. Board Ass'y Radio P.C. Board Ass'y Stereo Led P.C. Board Ass'y		TJS898200	Pulg (In Fun Bag)
	TNP82982H2Y	8-Range Selector Switch P.C. Board Ass'y			<b>TNP82964H1X LED P.C.BOARD</b>
	TNP81232-22 TNQ8940A EAS12P161S EAS3FP03A	Sub SIF P.C. Board Ass'y Cassette Ass'y (Non Available Parts) Speaker (Woofers) Speaker (Tweeter)	D300 D500 SW301	LN07201PF LN07201PF TSE80328	7-Range Led Meter 7-Range Led Meter Led On-Off Switch
	TNQ937 TSA800013 ⚠ TSX141-1 ⚠ TSX8365 ESB70263A	Microphone Rod Antenna Power Cord Car Cord Power Switch			<b>TNP82982H1X STEREO LED P.C. BOARD</b>
C712	TSE80332 TSE80427 TSE80428 TSE80133 ECEA1HS010	Sound IF Selector Switch MW/SW/FM Selector Switch LW Selector Switch TV/Radio/Tape/Line Function Switch Electrolytic 1μF 50V	D106	LN28RP	Stereo Led
C713 R713 VR62 VR63 VR91	ECEA1HS010 ERD25FJ563K EVVB1AF2523X EVVB0AF25B55 EVHBJA095B15	Electrolytic 1μF 50V Carbon 56KΩ J ¼W Contrast Control Bright Control Tuning Control		TSE80422	8-Range Selection Switch
	TJC80328-1 TXAJT3P226 TXAJT3P228 TXAJT3P268 TXAJT3P230	Antenna Terminal 3P Mini Connector Ass'y (Sleep Sw) 3P Mini Connector Ass'y (Microphone) 3P Mini Connector Ass'y (Microphone) 3P Mini Connector Ass'y (Speaker)			<b>TNP81870H1X DEFLECTION YOKE P.C.BOARD</b>
	TXAJT3P231 TXAJT3P248 TXAJTC4P252 TUW81940	3P Mini Connector Ass'y (Speaker) 5P Mini Connector Ass'y (SIF Switch) 3P Mini Connector Ass'y (Contrast Bright VR) 4P Mini Connector Ass'y (VR91 Tuning) Antenna Bracket	C340 R315	ECQM1H104JZ ERD25FJ271K	Polyester Capacitor 0.1μF J 50V Carbon Resistor 270Ω J ¼W
	TUW81950-3 TUW81382 TUX80992B TUX80988-3C TUW80601-2	Power Bracket (Non Available Parts) Control Bracket (Non Available Parts) Cassette Cover Bracket CRT Earth Bracket (SIF Selector) Switch Bracket	Q15 L143 C148 C601 R147	2SC1573NC TLU820K106C ECQM1H104JZ ECKD2H102KB2 ERD25FJ222K	Transistor (Video Output) Peaking Coil 82μH Polyester Capacitor 0.1μF J 50V Ceramic Capacity 1000pF K 500V Carbon Resistor 2.2KΩ J ¼W
	XTB4+20AFZ THE399-2 THN2967P XTB4+10AFN XTB4+35A	Screw (Rear Cover) Screw (CRT) Nut (Indicator) Screw (Tone Pwb) Screw (Audio)	R148 R149 R150 R151 R603	ERG1ANJ562 ERD25FJ224K ERD25FJ224K ERD25FJ563K ERC12GJ332	Metal Oxide Resistor 5.6KΩ J ¼W Carbon Resistor 220KΩ J ¼W Carbon Resistor 220KΩ J ¼W Carbon Resistor 56KΩ J ¼W Solid Resistor 3.3KΩ J ½W
	XTV3+10AFN TPC821011 TXAPD31200 TPE814017	Screw (Led Pwb) (Outer) Carton TR1230X Filler Complete Set Cover	R604 R607 R608 R609 VR64	ERD25FJ334K ERD25FJ103K ERD25FJ103K ERD25FJ822K EVLS0JA00B55	Carbon Resistor 330KΩ J ¼W Carbon Resistor 10KΩ J ¼W Carbon Resistor 10KΩ J ¼W Carbon Resistor 8.2KΩ J ¼W Sub. Bright Control 500KΩB
				TJS25640V	Picture Tube Socket
					<b>TNP81870-29H MAIN P.C. BOARD</b>
					<b>I. C.</b>
	IC11 IC12 IC31 IC51		IC11 IC12 IC31 IC51	TVSMPC1355C TVSMPC596C2 AN295 AN355	I.C. I.C. I.C. I.C.

Ref. No.	Part No.	Description			Ref. No.	Part No.	Description		
IC41	TVSMPC574J	I.C.			C143	ECEA0JS221	Electrolytic	220μF	6.3V
<b>TRANSISTORS</b>									
Q43	2SC1318	Transistor			C146	ECKD1H681KB9	Ceramic	680pF	K 50V
Q44	▲ 2SD772BLB	Transistor			C181	ECSF10E10Z	Tantal	4.7μF	16V
					C185	ECKD1H471KB2	Ceramic		
					C186	ECEA25Z4R7	Electrolytic	4.7μF	25V
<b>DIODES</b>									
D31	TVS10E1	Diode			C188	ECKD1H103PF2	Ceramic	0.01μF	P 50V
D38	MA150	Diode			C200	ECCD1H120J	Ceramic	12pF	J 50V
D43A	TVS10E2	Diode			C201	ECQS1471JWT	Styrol	470pF	J 100V
D43B	TVS10E2	Diode			C202	ECKD1H473ZF	Ceramic	0.047μF	Z 50V
D41	▲ TVSRD6R2EB2	Diode			C203	ECKD1H103PF2	Ceramic	0.01μF	P 50V
D44	TVS10E2	Diode			C204	ECEA1CS102	Electrolytic	1000μF	16V
D45	TVS3DL2	Diode			C205	ECCD1H151JP	Ceramic	150pF	J 50V
D48A	TVS3DL2A	Diode			C206	ECCD1H080CC	Ceramic	7pF	C 50V
D48B	TVS3DL2A	Diode			C207	ECQM1H103JZ	Polyester	0.01μF	J 50V
D76	TVSRD33EB	Diode			C208	ECQM1H153JZ	Polyester	0.015μF	J 50V
<b>COILS &amp; TRANSFORMERS</b>									
L101	TLUR68M106C	Peaking Coil	0.68μH		C209	ECKD1H102KB2	Ceramic	1000pF	K 50V
L103	TLI803326	Sound Trap Coil			C301	ECEA1CS470	Electrolytic	47μF	16V
L106	TLI801352	Video IF Trans.			C302	ECQM1H153JZ	Polyester	0.015μF	J 50V
L108	TLI801353	Video IF Trans.			C303	ECQM1H183JZ	Polyester	0.018μF	J 50V
L109	TLI805303	Video IF Trans.			C304	ECEA1ES4R7	Electrolytic	4.7μF	25V
L132	TTU100K106C	Peaking Coil	10μH		C305	ECQM1H103JZ	Polyester	0.01μF	J 50V
L133	TLU391K106C	Peaking Coil	390μH		C306	ECKD1H103PF2	Ceramic	0.01μF	P 50V
L201	TLS804308	Sound-IF Input Coil			C307	ECQS1682JWT	Styrol	6800pF	J 100V
L202	TLS803204	Sound Det. Trans.			C308	ECQM05332JZ	Polyester	3300pF	J 50V
L204	TLU100K106C	Peaking Coil	10μH		C309	ECKD1H473ZF	Ceramic	0.047μF	Z 50V
L302	TLU391K106C	Peaking Coil	390μH		C310	ECQM1H473JZ	Polyester	0.047μF	J 50V
L303	TLU100K106C	Peaking Coil	10μH		C311	ECEA0JS330	Electrolytic	33μF	6.3V
L403	TLH80706	Horiz. Width Coil			C312	ECSF16E4R7Y	Tantal	4.7μF	16V
L404	TLH80606	Horiz. Lin. Coil			C313	ECSZ10EF22N	Tantal	10μF	16V
L405	TLP408	Choke Coil			C314	ECEA1AS102	Electrolytic	1000μF	10V
L406	TLP408	Choke Coil			C315	ECQM1H104JZ	Styrol	0.1μF	J 50V
L407	▲ TLP412-2	Choke Coil			C316	ECEA1CS221	Electrolytic	220μF	16V
T401	▲ TLF80827	Flyback Trans.			C317	ECEA1CS471	Electrolytic	470μF	16V
T402	TLH80410	Horiz. Drive Trans.			C319	ECEA16Z10E	Electrolytic	10μF	16V
					C320	ECQM1H333JZ	Polyester	0.033μF	J 50V
<b>CAPACITORS</b>									
C101	ECKD1H103PF2	Ceramic	0.01μF	P	C321	TCSZ35EFR33V	Tantal	0.33μF	35V
C107	ECCD1H030CT	Ceramic	3pF	C	C322	ECEA1CS100	Electrolytic	10μF	16V
C108	ECCD1H030CT	Ceramic	3pF	C	C323	ECKD1H471KB2	Ceramic	470pF	K 50V
C109	ECCD1H040CT	Ceramic	4pF	C	C325	ECEA1HS2R2	Electrolytic	2.2μF	50V
C111	ECKD1H103PF2	Ceramic	0.01μF	P	C326	ECQM1H273JZ	Polyester	0.027μF	J 50V
C115	ECCD1H220JC2	Ceramic	18pF	J	C341	ECKD1H471KB2	Ceramic	470pF	K 50V
C116	ECCD1H151JC2	Ceramic	270pF	J	C342	ECKD1H103PF2	Ceramic	0.01μF	P 50V
C117	ECCD1H470J	Ceramic	39pF	J	C409	ECCD2H680K	Ceramic	68pF	K 500V
C118	ECKD1H102KB2	Ceramic	1000pF	K	C410	ECKD1H102KB2	Ceramic	1000pF	K 50V
C119	ECCD1H470J	Ceramic	47pF	J	C411	ECQM1H153JZ	Polyester	0.015μF	J 50V
C120	ECKD1H103PF2	Ceramic	0.01μF	P	C412	ECKD1H103PF2	Ceramic	0.01μF	P 50V
C121	ECKD1H103PF2	Ceramic	0.01μF	P	C413	ECKD2H222KB2	Ceramic	2200pF	K 500V
C124	ECCD1H680J	Ceramic	68pF	J	C415	ECKD2H102KB2	Ceramic	1000pF	K 500V
C125	ECCD1H101JP2	Ceramic	100pF	J	C417	▲ ECKD2H122KB	Ceramic	1200pF	K 500V
C131	ECEA1CS331	Electrolytic	330μF	16V	C418	▲ ECKD2H472KB	Ceramic	2200pF	K 500V
C136	ECEA1CS221	Electrolytic	220μF	16V	C419	▲ ECQM4393KZ	Polyester	0.039μF	K 400V
C142	ECQM1H182JZ	Polyester	1800pF	J	C420	▲ ECEA25W6R5Z	Electrolytic	6.5μF	25V
					C421	ECQM1H473JZ	Polyester	0.047μF	J 50V
					C422	ECKD2H102KB2	Ceramic	1000pF	K 500V
					C423	ECEA2CS100	Electrolytic	10μF	160V

Ref. No.	Part No.	Description					Ref. No.	Part No.	Description														
C424	ECKD2H391KB9	Ceramic	390pF	K	500V		R325	ERD25FJ274K	Carbon	270KΩ	J	1/4W											
C425	ECEA2CS4R7	Electrolytic	4.7μF		160V		R326	ERD25FJ223K	Carbon	22KΩ	J	1/4W											
C426	ECEA50V100Y	Electrolytic	100μF		50V		R327	ERD25FJ103K	Carbon	10KΩ	J	1/4W											
C427	ECKD1H103PF2	Ceramic	0.01μF	P	50V		R416	ERD25FJ102K	Carbon	1KΩ	J	1/4W											
C430	ECKD2H102KB2	Ceramic	1000pF	K	500V		R417	△ ERD25FJ470K	Carbon	47Ω	J	1/4W											
C705	ECET35R3325W	Electrolytic	3300μF		35V		R418	ERD25FJ2R2K	Carbon	2.2Ω	J	1/4W											
C710	ECEA1CS102	Electrolytic	1000μF		16V		R419	△ ERO12HJ100	Fuseble	10Ω	J	1/4W											
<b>RESISTORS</b>																							
R101	ERD25FJ390K	Carbon	39Ω	J	1/4W		R420	ERC12GJ123	Solid	12KΩ	J	1/4W											
R102	ERD25FJ103K	Carbon	1.8KΩ	J	1/4W		R421	ERD25FJ472K	Carbon	4.7KΩ	J	1/4W											
R104	ERD25FJ472K	Carbon	4.7KΩ	J	1/4W		R422	ERD25FJ271K	Carbon	270Ω	J	1/4W											
R105	ERD25FJ103K	Carbon	10KΩ	J	1/4W		R423	ERC12GJ186	Solid	18MΩ	J	1/4W											
R106	ERD25FJ681K	Carbon	680Ω	J	1/4W		R424	ERD25FJ473K	Carbon	47KΩ	J	1/4W											
R107	ERD25FJ471K	Carbon	470Ω	J	1/4W		R426	TRF2SKR47	Non Flame	0.47Ω	K	2W											
R108	ERD25FJ820K	Carbon	82Ω	J	1/4W		R427	ERC12GJ183	Solid	18KΩ	J	1/4W											
R141	ERD25FJ151K	Carbon	150Ω	J	1/4W		R716	△ ERD25FJ5R6K	Carbon	5.6Ω	J	1/4W											
R142	ERD25FJ221K	Carbon	220Ω	J	1/4W		J101	ERD25FJ390K	Carbon	39Ω	J	1/4W											
R143	ERD25FJ152K	Carbon	1.5KΩ	J	1/4W	<b>CONTROLS</b>																	
R144	ERD25FJ391K	Carbon	390Ω	J	1/4W	VR19	EVTVOUA00B14	RF AGC	10KΩB														
R145	ERD25FJ820K	Carbon	82Ω	J	1/4W	VR31	EVHOTAS20B25	Vert. Hold	200KΩB														
R146	ERD25FJ474K	Carbon	470KΩ	J	1/4W	VR32	EVTVOUA00B24	Vert. Height	20KΩB														
R152	ERD25FJ180K	Carbon	18Ω	J	1/4W	VR33	EVTVOUA00B23	Vert. Lin.	2KΩB														
R182	ERD25FJ473K	Carbon	47KΩ	J	1/4W	VR41	EVTVOUA00B52	Horiz. Hold	500ΩB														
R183	ERD25FJ333K	Carbon	33KΩ	J	1/4W	<b>OTHER PARTS</b>																	
R184	ERD25FJ562K	Carbon	5.6KΩ	J	1/4W	X141	EFCS4R5MJ1	4.5MHz Cerap															
R185	ERD25FJ103K	Carbon	10KΩ	J	1/4W	X142	EFCS5R5MJ1	5.5MHz Cerap															
R186	ERD25FJ822K	Carbon	8.2KΩ	J	1/4W	X143	EFCS6R0MJ1	6.5MHz Cerap															
R187	ERD25FJ331K	Carbon	330Ω	J	1/4W	FS1,3	△ XBA1E25NS5	Fuse (DC) 2.5A															
R189	ERD25FJ222K	Carbon	2.2KΩ	J	1/4W	TJC305-1	TJC305-1	Fuse Holder															
R191	ERD25FJ224K	Carbon	220KΩ	J	1/4W	<b>TNP81232-22 SUB P.C. BOARD</b>																	
R192	ERD25FJ273K	Carbon	27KΩ	J	1/4W	<b>I. C.</b>																	
R193	ERD25FJ682K	Carbon	6.8KΩ	J	1/4W	IC21	AN240PN	I.C.															
R201	△ ERD25FJ330K	Carbon	33Ω	J	1/4W	IC22	AN240PN	I.C.															
R203	ERD25FJ102K	Carbon	1KΩ	J	1/4W	<b>DIODE</b>																	
R204	ERD25FJ103K	Carbon	10KΩ	J	1/4W	D25	MA150	Diode															
R301	△ ERD25FJ470K	Carbon	47Ω	J	1/4W	D26	MA150	Diode															
R302	ERD25FJ272K	Carbon	2.7KΩ	J	1/4W	D27	MA150	Diode															
R303	ERD25FJ183K	Carbon	18KΩ	J	1/4W	<b>COILS</b>																	
R304	ERD25FJ330K	Carbon	33Ω	J	1/4W	L251	TLS804308	Coil															
R305	ERO25CKG2001	Metal	2KΩ	G	1/4W	L252	TLS803204	Coil															
R307	ERD25FJ5R6K	Carbon	5.6Ω	J	1/4W	L253	TLU100K106S	Peaking Coil															
R309	ERD25FJ470K	Carbon	47Ω	J	1/4W	L261	TLS804308	Coil															
R310	ERD25FJ472K	Carbon	4.7KΩ	J	1/4W	L262	TLS803204	Coil															
R311	△ ERD25FJ1R1K	Carbon	1.1Ω	J	1/4W	L263	TLU100K106S	Peaking Coil															
R312	ERD25FJ821K	Carbon	820Ω	J	1/4W	<b>CAPACITORS</b>																	
R316	ERD25FJ221K	Carbon	220Ω	J	1/4W	C250	ECCD1H060CC	Ceramic	6pF	C	50V												
R317	ERD25FJ823K	Carbon	82KΩ	J	1/4W	C251	ECQS1331JWT	Styrol	130pF	J	100V												
R318	ERD25FJ101K	Carbon	100Ω	J	1/4W	C252	ECKD1H473ZF2	Ceramic	0.047μF	Z	50V												
R319	ERD25FJ683K	Carbon	68KΩ	J	1/4W	C253	ECKD1H473ZF2	Ceramic	0.047μF	Z	50V												
R320	ERD25FJ154K	Carbon	150KΩ	J	1/4W	C254	ECQM1H153JZ	Polyester	0.015μF	J	50V												
R321	ERD25FJ102K	Carbon	1KΩ	J	1/4W	C255	ECCD1H101JP2	Ceramic	100pF	J	50V												
R322	ERD25FJ392K	Carbon	3.9KΩ	J	1/4W																		
R323	ERD25FJ390K	Carbon	39Ω	J	1/4W																		
R324	ERD25FJ122K	Carbon	1.2KΩ	J	1/4W																		

Ref. No.	Part No.	Description					Ref. No.	Part No.	Description				
C256	ECCD1H080CC	Ceramic	8pF	C	50V		R1454	ERD25FJ682K	Carbon	6.8KΩ	J	1/4W	
C258	ECKD1H473ZF2	Ceramic	0.047μF	Z	50V		R1550	ERD25FJ392K	Carbon	3.9KΩ	J	1/4W	
C260	ECCD1H120JP	Ceramic	12pF	J	50V		R1551	ERD25FJ122K	Carbon	1.2KΩ	J	1/4W	
C261	ECQS1271JWT	Styrol	270pF	J	100V		R1552	ERD25FJ392K	Carbon	3.9KΩ	J	1/4W	
C262	ECKD1H473ZF2	Ceramic	0.047μF	Z	50V		R1553	ERD25FJ563K	Carbon	56KΩ	J	1/4W	
C263	ECKD1H473ZF2	Ceramic	0.047μF	Z	50V		R1554	ERD25FJ682K	Carbon	6.8KΩ	J	1/4W	
C264	ECQM1H153JZ	Polyester	0.015μF	J	50V								CONTROLS
C265	ECCD1H820JP2	Ceramic	82pF	J	50V		VR130	EVAT09C20G15	Balance	100KΩG			
C266	ECCD1H080CC	Ceramic	8pF	C	50V		VR131	EVBV31C20A54	Bass	50KΩA			
C271	ECEA1ES4R7	Electrolytic	4.7μF		25V		VR132	EVBV31C20A54	Treble	50KΩA			
		<b>RESISTORS</b>					VR133	EVBV29C20A14	Volume	10KΩA			
R254	ERD25FJ223K	Carbon	22KΩ	J	1/4W								<b>OTHER PARTS</b>
R255	ERD25FJ124K	Carbon	120KΩ	J	1/4W		TSE80132	TXAJT4P113A	TV/Radio/Tape/Line Function Switch				
R264	ERD25FJ223K	Carbon	22KΩ	J	1/4W		TXAJT4P114A	TUAJT4P114A	4P Mini. Connector Ass'y				
R265	ERD25FJ104K	Carbon	100KΩ	J	1/4W		TUW81383	Tone Volume Bracket (Non Available Part)					
R271	ERD25FJ124K	Carbon	120KΩ	J	1/4W								
R272	ERD25FJ104K	Carbon	100KΩ	J	1/4W								
R341	ERD25FJ153K	Carbon	15KΩ	J	1/4W								
VR34	EVTVOUA00B15	Control	500KΩB										
	TJT8902A	1P Socket											
		<b>TNP82517-21 POWER P.C. BOARD</b>											
D781	▲ TVS30D1	Power Rectifier											<b>I.C.</b>
D782	▲ TVS30D1	Power Rectifier					IC130	TVSLB1405	I.C.				
D783	▲ TVS30D1	Power Rectifier					IC131	TVSLB1405	I.C.				
D784	▲ TVS30D1	Power Rectifier											
C781	ECFW104KDY	Ceramic Capacitor	0.1μF	K	50V								
C782	ECFW104KDY	Ceramic Capacitor	0.1μF	K	50V		Q301	2SC828AR	Transistor				
C783	ECFW104KDY	Ceramic Capacitor	0.1μF	K	50V		Q302	2SC828AR	Transistor				
C784	ECFW104KDY	Ceramic Capacitor	0.1μF	K	50V		Q303	2SA564AR	Transistor				
C785	ECQM1H103JZ	Polyester Capacitor	0.1μF	K	50V		Q501	2SC828AR	Transistor				
FS1~4	TJC3316	Fuse Holder					Q502	2SC828AR	Transistor				
AU	TJS868250	3P Mini. Connector Plug					Q503	2SA564AR	Transistor				
	TJS828050	DC Socket					C1301	ECEA1ES3R3	Electrolytic	3.3μF		25V	
	TUW81948-1	Power Bracket (Non Available Parts)					C1302	ECEA1ES3R3	Electrolytic	3.3μF		25V	
L781,782	TSE80103-8	Switch					C1303	ECKD1H471KB2	Ceramic	470pF	K	50V	
	TLP80601	Coil Trans.					C1304	ECEA1ES4R7	Electrolytic	4.7μF		25V	
		<b>TNP82958-31 TONE P.C. BOARD</b>					C1305	ECCD1H470K	Ceramic	47pF	K	50V	
		<b>CAPACITORS</b>					C1351	ECEA1ES3R3	Electrolytic	3.3μF		25V	
C1450	ECQM1H103JZ	Polyester	0.01μF	J	50V		C1352	ECEA1ES3R3	Electrolytic	3.3μF		25V	
C1451	ECQM1H154JZ	Polyester	0.15μF	J	50V		C1353	ECKD1H471KB2	Ceramic	470pF	K	50V	
C1452	ECQM1H472JZ	Polyester	4700pF	J	50V		C1354	ECEA1ES4R7	Electrolytic	4.7μF		25V	
C1453	ECQM1H273JZ	Polyester	0.027μF	J	50V		C1355	ECCD1H470K	Ceramic	47pF	K	50V	
C1550	ECQM1H103JZ	Polyester	0.01μF	J	50V								
C1551	ECQM1H154JZ	Polyester	0.15μF	J	50V								
C1552	ECQM1H472JZ	Polyester	4700pF	J	50V								
C1553	ECQM1H273JZ	Polyester	0.027μF	J	50V								
		<b>RESISTORS</b>											
R1450	ERD25FJ392K	Carbon	3.9KΩ	J	1/4W		R1301	ERD10TJ102	Carbon	1KΩ	J	1/8W	
R1451	ERD25FJ122K	Carbon	1.2KΩ	J	1/4W		R1302	ERD10TJ332	Carbon	3.3KΩ	J	1/8W	
R1452	ERD25FJ392K	Carbon	3.9KΩ	J	1/4W		R1303	ERD10TJ183	Carbon	18KΩ	J	1/8W	
R1453	ERD25FJ563K	Carbon	56KΩ	J	1/4W		R1304	ERD10TJ222	Carbon	2.2KΩ	J	1/8W	
							R1305	ERD10TJ104	Carbon	100KΩ	J	1/8W	
							R1306	ERD10TJ153	Carbon	15KΩ	J	1/8W	
							R1307	ERD10TJ103	Carbon	10KΩ	J	1/8W	
							R1308	ERD10TJ104	Carbon	100KΩ	J	1/8W	
							R1309	ERD10TJ103	Carbon	10KΩ	J	1/8W	
							R1310	ERD10TJ561	Carbon	560Ω	J	1/8W	
							R1311	ERD10TJ561	Carbon	560Ω	J	1/8W	
							R1312	ERD10TJ103	Carbon	10KΩ	J	1/8W	

Ref. No.	Part No.	Description				Ref. No.	Part No.	Description					
R1313	ERD10TJ472	Carbon	4.7KΩ	J	1/8W	R96	ERD25FJ562K	Carbon	5.6KΩ	J 1/4W			
R1314	ERD25FJ100K	Carbon	10Ω	J	1/4W			<b>CONTROL</b>					
R1345	ERD10TJ823	Carbon	82KΩ	J	1/8W	VR92	EVNK0AA00B24	Control	20KΩB				
R1351	ERD10TJ102	Carbon	1KΩ	J	1/8W	VR93	EVNK0AA00B54	Control	50KΩB				
R1352	ERD10TJ332	Carbon	3.3KΩ	J	1/8W	VR94	EVNK0AA00B15	Control	100KΩB				
R1353	ERD10TJ183	Carbon	18KΩ	J	1/8W	VR95	EVNK0AA00B15	Control	100KΩB				
R1354	ERD10TJ222	Carbon	2.2KΩ	J	1/8W	VR96	EVNK0AA0BB25	Control	100KΩB				
R1355	ERD10TJ104	Carbon	100KΩ	J	1/8W	VR97	EVNK0AA0BB55	Control	500KΩB				
R1356	ERD10TJ153	Carbon	15KΩ	J	1/8W	VR98	EVNK0AA0BB14	Control	10KΩB				
R1357	ERD10TJ103	Carbon	10KΩ	J	1/8W			<b>OTHER PARTS</b>					
R1358	ERD10TJ104	Carbon	100KΩ	J	1/8W	U	TJS868360	6P Socket Plug					
R1359	ERD10TJ103	Carbon	10KΩ	J	1/8W	TU	TJS868330	4P Socket Plug					
R1360	ERD10TJ561	Carbon	560Ω	J	1/8W	X91	EFCA92R00M0	Ceramic Filter					
R1361	ERD10TJ561	Carbon	560Ω	J	1/8W	X92	TNQ8934-1	U/V Separator					
R1362	ERD10TJ103	Carbon	10KΩ	J	1/8W		TXAJTN6P199	6P Connector Ass'y					
R1363	ERD10TJ472	Carbon	4.7KΩ	J	1/8W		TXAJTC3P535	4P Connector Ass'y					
R1364	ERD25FJ100K	Carbon	10Ω	±5%	1/4W								
<b>OTHER PARTS</b>													
VR301	EVNK0BA00B53	Led Meter Level Control	5KΩB					<b>TNP82982-22H RADIO P.C. BOARD</b>					
VR302	EVNK0BA00B53	Led Meter Level Control	5KΩB										
LM	TJS868330	4P L-Type Mini. Connector Plug											
<b>TNP92901 TUNER P.C. BOARD</b>													
<b>TUNER</b>													
IC91	TNV86906F1F	UHF Tuner				Q101	2SC1686	FM RF AMP.					
D91	TNV16908F1F	VHF Tuner				Q102	2SC1359B	FM MIX. (B)					
D92	AN5700	I.C.				Q103	2SC1359B	FM OSC. (C)					
	MA856	Diode				Q104	2SC828AR	Muting					
	MA856	Diode						<b>TRANSISTORS</b>					
D93	TVSRD5R1JB3	Diode				D101	TVS1S2687	FM AFC					
D94	MA150	Diode				D102	OA91	FM DET.					
D95	MA150	Diode				D103	OA91	FM DET.					
D96	MA150	Diode				D104	MA150	FM Meter					
D97	MA150	Diode				D111	OA91	AM Meter					
D98	MA150	Diode				D112	OA91	AM DET.					
D99	MA150	Diode						<b>DIODES</b>					
<b>CAPACITOR</b>													
C91	ECKD1H102KB2	Ceramic	1000pF	K	50V	L1001	TLR80208	FM Antenna coil					
C92	ECEA1CS100	Electrolytic	10μF		16V	L1002	TLR80208	FM OSC. Coil					
C93	ECEA1CS100	Electrolytic	10μF		16V	L1003	RLQY75S5	Trap Coil					
C94	ECKD1H103KB2	Ceramic	0.01μF	K	50V	L1004	TLT331-999	Peaking Coil	330μH				
C95	ECEA1HS010	Electrolytic	1μF		50V	L1005	TLT270-999	Peaking Coil	27μH				
C96	ECKD1H223PF2	Ceramic	0.022μF	P	50V	L1081	TLQ393J106G	Peaking Coil	0.039H				
C97	ECEA1CS470	Electrolytic	47μF		16V	L1082	TLQ393J106G	Peaking Coil	0.039H				
C98	ECKD1H102KB2	Ceramic	1000pF	K	50V	L1101	RLQY75S5	Trap Coil					
C99	TCCF1H0R5BR6	Ceramic	0.5pF		50V	L1102	TLR80123	Bar Antenna Coil					
						L1103	ELA7S755C	SM RF Coil					
<b>RESISTORS</b>													
R91	ERD25FJ103K	Carbon	10KΩ	J	1/4W	L1104	QL02M5	AM OSC. Coil					
R92	ERD25FJ472K	Carbon	4.7KΩ	J	1/4W	L1105	RL02M14	SW1 OSC Coil					
R93	ERD25FJ103K	Carbon	10KΩ	J	1/4W	L1106	ELL7E758C	SW2 OSC Coil					
R94	ERD25FJ334K	Carbon	330KΩ	J	1/4W			<b>TRANSFORMERS</b>					
R95	ERD25FJ102K	Carbon	1KΩ	J	1/4W	T1001	RLI4M101	FM IF Trans.					
						T1002	RLI4M504	FM DET. Trans.					

Ref. No.	Part No.	Description				Ref. No.	Part No.	Description			
T1003 Δ	RLI4M506	FM DET. Trans.				C1107	ECCD1H271JC	Ceramic	270pF	J	50V
T1101 Δ	RLI2M201	AM IF Trans.				C1108	ECCD1H151JC	Ceramic	150pF	J	50V
T1102 Δ	RLI2M202	AM IF Trans.				C1109	ECCD1H150JC	Ceramic	15pF	J	50V
T1103 Δ	RLI2M402	AM DET. Trans.				C1110	ECV1ZW10X53N	Variable			
<b>CAPACITORS</b>											
C1001	PVC22K20T1LG					C1111	ECV1ZW10X53N	Variable			
C1004	ECCD1H270JC2	Ceramic	27pF	J	50V	C1112	ECQS1361JWT	Styrol	360pF	J	100V
C1005	ECKD1H103PF2	Ceramic	0.01μF	P	50V	C1113	ECCD1H070CC	Ceramic	7pF	C	50V
C1006	ECCD1H050CC	Ceramic	5pF	C	50V	C1114	ECQS1472JWT	Styrol	4200pF	J	100V
C1007	ECCD1H180JC	Ceramic	18pF	J	50V	C1115	ECKD1H103PF2	Ceramic	0.01μF	P	50V
C1008	ECCD1H050CC	Ceramic	5pF	C	50V	C1116	ECKD1H223PF2	Ceramic	0.022μF	P	50V
C1009	ECCD1H390JC2	Ceramic	39pF	J	50V	C1131	ECEA1AS471	Electrolytic	470μF		10V
C1010	ECKD1H103KB2	Ceramic	0.01μF	K	50V	C1132	ECKD1H102KB2	Ceramic	1000pF	K	50V
C1011	ECKD1H103PF2	Ceramic	0.01μF	P	50V	C1133	ECEA1HS010	Electrolytic	1μF		50V
C1012	ECCD1H050CS	Ceramic	5pF	C	50V	C1134	ECEA1CS100	Electrolytic	10μF		16V
C1013	ECCD1H080DS	Ceramic	8pF	D	50V	C1135	ECKD1H223PF2	Ceramic	0.022μF	P	50V
C1014	ECCD1H390JS	Ceramic	39pF	J	50V	C1136	ECKD1H103PF2	Ceramic	0.01μF	P	50V
C1015	ECCD1H120JS	Ceramic	12pF	J	50V	C1137	ECKD1H103PF2	Ceramic	0.01μF	P	50V
C1017	ECCD1H060CS	Ceramic	6pF	C	50V	C1138	ECKD1H223PF2	Ceramic	0.022μF	P	50V
C1018	ECKD1H223PF2	Ceramic	0.022μF	P	50V	C1139	ECQM1H683JZ	Polyester	0.068μF	J	50V
C1019	ECKD1H331KB	Ceramic	330pF	K	50V	C1140	ECCD1H271JC2	Ceramic	270pF	J	50V
C1020	ECKD1H103PF2	Ceramic	0.01μF	P	50V	C1141	ECKD1H223PF2	Ceramic	0.022μF	P	50V
C1050	ECKD1H102KB2	Ceramic	1000pF	K	50V	C1180	ECEA1AS101	Electrolytic	100μF		10V
C1051	ECKD1H103PF2	Ceramic	0.01μF	P	50V	<b>RESISTORS</b>					
C1052	ECKD1H223PF2	Ceramic	0.022μF	P	50V	R1001	ERD10TJ104	Carbon	100KΩ	J	1/8W
C1053	ECKD1H223PF2	Ceramic	0.022μF	P	50V	R1002	ERD10TJ270	Carbon	27Ω	J	1/8W
C1054	ECKD1H331KB	Ceramic	330pF	K	50V	R1003	ERD10TJ122	Carbon	1.2KΩ	J	1/8W
C1055	ECEA1ES4R7	Electrolytic	4.7μF		25V	R1004	ERD10TJ474	Carbon	470KΩ	J	1/8W
C1056	ECCD1H271J	Ceramic	270pF	J	50V	R1005	ERD10TJ471	Carbon	470Ω	J	1/8W
C1057	ECCD1H271J	Ceramic	270pF	J	50V	R1006	ERD10TJ751	Carbon	750Ω	J	1/8W
C1059	ECEA1HSR47	Electrolytic	0.47μF		50V	R1007	ERD10TJ104	Carbon	100KΩ	J	1/8W
C1060	ECEA1ES4R7	Electrolytic	4.7μF		25V	R1009	ERD10TJ122	Carbon	1.2KΩ	J	1/8W
C1061	ECKD1H103PF2	Ceramic	0.01μF	P	50V	R1010	ERD10TJ102	Carbon	1KΩ	J	1/8W
C1062	ECKD1H103PF2	Ceramic	0.01μF	P	50V	R1011	ERD10TJ104	Carbon	100KΩ	J	1/8W
C1081	ECEA1CS330	Electrolytic	33μF		16V	R1012	ERD10TJ473	Carbon	47KΩ	J	1/8W
C1083	ECQM1H153JZ	Polyester	0.015μF	J	50V	R1051	ERD10TJ101	Carbon	100Ω	J	1/8W
C1084	ECEA1ES4R7	Electrolytic	4.7μF		25V	R1052	ERD10TJ102	Carbon	1KΩ	J	1/8W
C1085	ECQM1H182JZ	Polyester	1800pF	J	50V	R1053	ERD10TJ470	Carbon	47Ω	J	1/8W
C1086	ECQM1H153JZ	Polyester	0.015μF	J	50V	R1054	ERD10TJ102	Carbon	1KΩ	J	1/8W
C1087	ECEA1ES4R7	Electrolytic	4.7μF		25V	R1055	ERD10TJ102	Carbon	1KΩ	J	1/8W
C1088	ECQM1H182JZ	Polyester	1800pF	J	50V	R1056	ERD10TJ682	Carbon	6.8KΩ	J	1/8W
C1089	ECFWWD152KAY	Ceramic	1500pF	K	25V	R1057	ERD10TJ822	Carbon	8.2KΩ	J	1/8W
C1090	ECQM1H332JZ	Polyester	3300pF	J	50V	R1058	ERD10TJ821	Carbon	820Ω	J	1/8W
C1091	ECFWWD152KAY	Ceramic	1500pF	K	25V	R1059	ERD10TJ153	Carbon	15KΩ	J	1/8W
C1092	ECQM1H332JZ	Polyester	3300pF	J	50V	R1062	ERD10TJ102	Carbon	1KΩ	J	1/8W
C1093	ECQS1331JWT	Styrol	330pF	J	100V	R1063	ERD10TJ104	Carbon	100KΩ	J	1/8W
C1094	ECEA50ZR22	Electrolytic	0.22μF		50V	R1081	ERD10TJ183	Carbon	18KΩ	J	1/8W
C1095	ECEA50ZR47	Electrolytic	0.047μF		50V	R1082	ERD10TJ473	Carbon	47KΩ	J	1/8W
C1096	ECEA1CS100	Electrolytic	10μF		16V	R1083	ERD10TJ823	Carbon	82KΩ	J	1/8W
C1097	ECEA1HS010	Electrolytic	1μF		50V	R1084	ERD10TJ272	Carbon	2.7KΩ	J	1/8W
C1098	ECQM1H473JZ	Polyester	0.047μF	J	50V	R1085	ERD10TJ272	Carbon	2.7KΩ	J	1/8W
C1100	ECCD1H040CC	Ceramic	4pF	C	50V	R1086	ERD10TJ561	Carbon	560Ω	J	1/8W
C1101	ECCD1H560JP	Ceramic	56pF	J	50V	R1087	ERD10TJ682	Carbon	6.8KΩ	J	1/8W
C1102	QCV2120	Trimmer				R1088	ERD10TJ332	Carbon	3.3KΩ	J	1/8W
C1104	ECCD1H470JPN	Ceramic	47pF	J	50V	R1090	ERD10TJ682	Carbon	6.8KΩ	J	1/8W

Ref. No.	Part No.	Description				Ref. No.	Part No.	Description		
R1091	ERD10TJ332	Carbon	3.3KΩ	J	1/8 W	Q154	2SC828AR	Transistor		
R1093	ERD10TJ273	Carbon	27KΩ	J	1/8 W	Q155	2SC828AR	Transistor		
R1094	ERD10TJ102	Carbon	1KΩ	J	1/8 W					
R1095	ERD10TJ682	Carbon	6.8KΩ	J	1/8 W					
R1101	ERD10TJ270	Carbon	27Ω	J	1/8 W					
R1102	ERD10TJ391	Carbon	390Ω	J	1/8 W	D75	TVSRD4R7EB	Diode		
R1103	ERD10TJ103	Carbon	10KΩ	J	1/8 W	D78	TVS10E1	Diode		
R1104	ERD10TJ270	Carbon	27Ω	J	1/8 W	D80	TVS10E2	Diode		
R1105	ERD10TJ330	Carbon	33Ω	J	1/8 W	D81	TVSKB462F	Diode		
R1130	ERD10TJ470	Carbon	47Ω	J	1/8 W	D82	MA26	Diode		
R1131	ERD10TJ473	Carbon	47KΩ	J	1/8 W	D121	MA150	Diode		
R1132	ERD10TJ103	Carbon	10KΩ	J	1/8 W	D122	MA150	Diode		
R1133	ERD10TJ682	Carbon	6.8KΩ	J	1/8 W	D123	TVSKB265A	Diode		
R1134	ERD10TJ822	Carbon	8.2KΩ	J	1/8 W	D141	MA150	Diode		
R1135	ERD10TJ153	Carbon	15KΩ	J	1/8 W	D151	MA150	Diode		
R1180	ERD25FJ471K	Carbon	470Ω	J	1/4 W					
<b>CONTROLS</b>										
VR101	EVNK4AA00B14	Freq. Adj.	10KΩB			L1201	QLB0155	Oscillator Coil		
VR102	EVNK4AA00B53	Separation Adj.	5KΩB			L1202	TLU270K106C	Peaking Coil		
<b>C-R COMBINATIONS</b>										
X1001	TXCFF88108W	FM Band Pass Filter				L1203	TLU391K106C	Peaking Coil		
X1002	TFCS10R7M-2	10.7MHz Cerap				L1401	ELM7Q718A	Trap Coil		
						L1501	ELM7Q718A	Trap Coil		
<b>OTHER PARTS</b>										
S0	TSE80331	LW Selector Switch								
S1	TSE80331	MW Selector Switch								
S2	TSE80331	SW Selector Switch								
S3	TSE80331	FM Selector Switch								
P2,4	XAM64C120	Pilot Lamp								
P1,5	XAM64C260	Pilot Lamp								
AT,RC	TJS868250	3-P Mini. Connector Plug								
RD	TJS868270	5-P Mini. Connector Plug								
	TXAJT7P006A	7-P Mini. Connector Ass'y								
	TXAJTC6P200	6P Connector Ass'y								
<b>TNP91919-21 AUDIO P.C. BOARD</b>										
<b>I. C.</b>										
IC121	TVSSTK433	I.C.								
<b>TRANSISTORS</b>										
Q71	2SC828AR	Transistor								
Q72	2SB621ARNC	Transistor								
Q73	2SB761QLB	Transistor								
Q121	2SC828AR	Transistor								
Q122	2SC828AQ	Transistor								
Q124	2SC1383R	Transistor								
Q141	2SC644S	Transistor								
Q142	2SC828AR	Transistor								
Q143	2SC644S	Transistor								
Q144	2SC828AR	Transistor								
Q145	2SC828AR	Transistor								
Q151	2SC644S	Transistor								
Q152	2SC828AR	Transistor								
Q153	2SC644S	Transistor								
<b>DIODES</b>										
D75	TVSRD4R7EB	Diode								
D78	TVS10E1	Diode								
D80	TVS10E2	Diode								
D81	TVSKB462F	Diode								
D82	MA26	Diode								
D121	MA150	Diode								
D122	MA150	Diode								
D123	TVSKB265A	Diode								
D141	MA150	Diode								
D151	MA150	Diode								
<b>COILS</b>										
L1201	QLB0155	Oscillator Coil								
L1202	TLU270K106C	Peaking Coil								
L1203	TLU391K106C	Peaking Coil								
L1401	ELM7Q718A	Trap Coil								
L1501	ELM7Q718A	Trap Coil								
<b>CAPACITORS</b>										
C706	ECEA1CS100	Electrolytic	10μF		16V					
C707	ECCD1H101JP2	Ceramic	100pF	J	50V					
C708	ECQM1H273JZ	Polyester	0.027μF	J	50V					
C709	ECEA1CS101	Electrolytic	100μF		16V					
C710	ECKD1H472KB2	Ceramic	4700pF	K	50V					
C1201	ECEA50ZR22	Electrolytic	0.22μF		50V					
C1203	ECEA1CS101	Electrolytic	100μF		16V					
C1204	ECQM1H822JZ	Polyester	8200pF	J	50V					
C1205	ECEA1CS331	Electrolytic	330μF		16V					
C1206	ECQM1H102JZ	Polyester	1000pF	J	50V					
C1207	ECCD1H101JP2	Ceramic	100pF	J	50V					
C1208	ECEA1CS221	Electrolytic	220μF		16V					
C1209	ECEA1AS101	Electrolytic	100μF		10V					
C1210	ECQM1H472JZ	Polyester	4700pF	J	50V					
C1211	ECEA1HS010	Electrolytic	1μF		50V					
C1213	ECEA1VS101	Electrolytic	100μF		35V					
C1214	ECEA1CS331	Electrolytic	330μF		16V					
C1215	ECET35R332SW	Electrolytic	3300μF		35V					
C1216	ECEA1CS332	Electrolytic	3300μF		16V					
C1217	ECEA1CS100	Electrolytic	10μF		16V					
C1220	ECKD1H103KB2	Ceramic	0.01μF	K	50V					
C1223	ECEA16Z10E	Electrolytic	10μF		16V					
C1225	ECEA1AS221	Electrolytic	220μF		10V					
C1226	ECCD1H221J2	Ceramic	220pF	J	50V					
C1227	ECEA1ES4R7	Electrolytic	4.7μF		15V					
C1230	ECEA1CS100	Electrolytic	10μF		16V					
C1232	ECEA1AS471	Electrolytic	470μF		10V					
C1233	ECCD1H470JPN	Ceramic	47pF	J	50V					
C1251	ECCD1H470JPN	Ceramic	47pF	J	50V					
C1401	ECEA50ZR22	Electrolytic	0.22μF		50V					
C1402	ECQM1H103JZ	Polyester	0.01μF	J	50V					
C1404	ECEA50ZR47	Electrolytic	0.47μF		50V					
C1405	ECCD1H181JC	Ceramic	180pF	J	50V					
C1406	ECCD1H820JP2	Ceramic	82pF	J	50V					

Ref. No.	Part No.	Description					Ref. No.	Part No.	Description				
C1407	ECCD1H101JP2	Ceramic	100pF	J	50V		C1541	ECQM1H332JZ	Polyester	3300pF	J	50V	
C1409	ECEA1ES3R3	Electrolytic	3.3μF		25V		C1542	ECEA50ZR47	Electrolytic	0.47μF		50V	
C1410	ECEA1CN330S	Electrolytic	33μF		16V		C1543	ECEA1AS221	Electrolytic	220μF		10V	
C1411	ECEA1ES3R3	Electrolytic	3.3μF		25V		C1544	ECEA1CS470	Electrolytic	47μF		16V	
C1412	ECCD1H271JC	Ceramic	270pF	J	50V		C1545	ECEA1ES471	Electrolytic	470μF		25V	
C1413	ECCD1H181JC	Ceramic	180pF	J	50V		C1546	ECQM1H104JZ	Polyester	0.1μF	J	50V	
C1414	ECCD1H560JP	Ceramic	56pF	J	50V								
C1415	ECEA0JS330	Electrolytic	33μF		6.3V								
C1416	ECEA1ES3R3	Electrolytic	3.3μF		25V								
C1417	ECQM1H153JZ	Polyester	0.015μF	J	50V								
C1418	ECQM1H332JZ	Polyester	3300pF	J	50V		R701	ERO25CKG3901	Metal	3.9KΩ	J	1/4W	
C1421	ECEA1ES4R7	Electrolytic	4.7μF		25V		R702	ERO25CKG3801	Metal	1.8KΩ	J	1/4W	
C1423	ECCD1H151JP	Ceramic	150pF	J	50V		R703	ERD25FJ561K	Carbon	560Ω	J	1/4W	
C1424	ECEA1CSV00	Electrolytic	10μF		16V		R705	ERD25FJ682K	Carbon	6.8KΩ	J	1/4W	
C1425	ECEA1ES3R3	Electrolytic	3.3μF		25V		R706	ERD25FJ101K	Carbon	100Ω	J	1/4W	
C1426	ECQM1H332JZ	Polyester	3300pF	J	50V		R707	ERC12GJ121	Solid	120Ω	J	1/2W	
C1427	ECQS1821JWT	Styrol	820pF	J	100V		R708	ERD25FJ680K	Carbon	68Ω	J	1/4W	
C1428	ECQM1H102JZ	Polyester	1000pF	J	50V		R711A	ERD50FJ2R7	Metal Oxide	56Ω	J	1W	
C1429	ECEA0JS330	Electrolytic	33μF		6.3V		R712	ERQ2CJ2R7	Carbon	27Ω	J	1/2W	
C1430	ECQM1H152JZ	Polyester	1500pF	J	50V								
C1431	ECCD1H470JPN	Ceramic	47pF	J	50V		R715	ERD15FJ124K	Fuseble	2.7Ω	J	2W	
C1438	ECEA1CS100	Electrolytic	10μF		16V		R1201	ERD25FJ562K	Carbon	120KΩ	J	1/4W	
C1441	ECQM1H332JZ	Polyester	3300pF	J	50V		R1202	ERD25FJ8R2	Carbon	5.6KΩ	J	1/4W	
C1442	ECEA50ZR47	Electrolytic	0.47μF		50V		R1203	ERD25FJ101K	Carbon	8.2Ω	J	1/4W	
C1443	ECEA1AS221	Electrolytic	220μF		10V		R1204	ERD25FJ1R0K	Carbon	100Ω	J	1/4W	
C1444	ECEA1CS470	Electrolytic	47μF		16V		R1205	ERD25FJ102K	Carbon	1Ω	J	1/4W	
C1445	ECEA1ES471	Electrolytic	470μF		25V		R1206	ERD25FJ562K	Carbon	1KΩ	J	1/4W	
C1446	ECQM1H104JZ	Polyester	0.1μF	J	50V		R1207	ERD25FJ103K	Carbon	5.6KΩ	J	1/4W	
C1501	ECEA50ZR22	Electrolytic	0.22μF		50V		R1208	ERD25FJ472K	Carbon	10KΩ	J	1/4W	
C1502	ECQM1H103JZ	Polyester	0.47μF	J	50V		R1209	ERD25FJ150K	Carbon	4.7KΩ	J	1/4W	
C1504	ECEA50ZR47	Electrolytic	0.47μF		50V		R1210	ERD25FJ684K	Non Flame	15Ω	J	1/4W	
C1505	ECCD1H181JC	Ceramic	180pF	J	50V		R1214	TRF5SK8R2	Non Flame	680KΩ	J	1/4W	
C1506	ECCD1H820JP2	Ceramic	82pF	J	50V			TRF5SJ120					
C1507	ECCD1H101JP2	Ceramic	100pF	J	50V		R1217	ERD25FJ122K	Carbon	8.2Ω	K	5W	
C1509	ECEA1ES3R3	Electrolytic	3.3μF		25V		R1219	ERD25FJ681K	Carbon	12Ω	J	5W	
C1510	ECEA1CN330S	Electrolytic	33μF		16V		R1220	ERD25FJ271K	Carbon	1.2KΩ	J	1/4W	
C1511	ECEA1ES3R3	Electrolytic	3.3μF		25V		R1221	ERD25FJ102K	Carbon	680Ω	J	1/4W	
C1512	ECCD1H271JC	Ceramic	270pF	J	50V		R1222	ERD25FJ473K	Carbon	270Ω	J	1/4W	
C1513	ECCD1H181JC	Ceramic	180pF	J	50V								
C1514	ECCD1H560JP	Ceramic	56pF	J	50V		R1223	ERD25FJ820K	Carbon	1KΩ	J	1/4W	
C1515	ECEA0JS330	Electrolytic	33μF		6.3V		R1224	ERD25FJ561K	Carbon	470KΩ	J	1/4W	
C1516	ECEA1ES3R3	Electrolytic	3.3μF		25V		R1225	ERD25FJ105K	Carbon	82Ω	J	1/4W	
C1517	ECQM1H153JZ	Polyester	0.015μF	J	50V		R1226	ERD25FJ122K	Carbon	560Ω	J	1/4W	
C1518	ECQM1H332JZ	Polyester	3300μF	J	50V		R1227	ERC12GJ561	Solid	1MΩ	J	1/4W	
C1521	ECEA1ES4R7	Electrolytic	4.7μF		25V		R1228	ERD25FJ183K	Carbon	1.2KΩ	J	1/4W	
C1523	ECCD1H151JP	Ceramic	150pF	J	50V		R1229	ERD25FJ332K	Carbon	3.3KΩ	J	1/4W	
C1524	ECEA1CS100	Electrolytic	10μF		16V		R1230	ERD25FJ101K	Carbon	100Ω	J	1/4W	
C1525	ECEA1ES3R3	Electrolytic	3.3μF		25V		R1232	TRF2SK2R7	Non Flame	2.7Ω	K	2W	
C1526	ECQM1H332JZ	Polyester	3300μF	J	50V		R1233	TRF5SJ120	Non Flame	12Ω	J	5W	
C1527	ECQS1821JWT	Styrol		J			R1241	ERD25TJ823	Carbon	82KΩ	J	1/4W	
C1528	ECQM1H102JZ	Polyester	1000pF	J	50V		R1401	ERD25FJ153K	Carbon	15KΩ	J	1/4W	
C1529	ECKD1H102KB2	Ceramic	1000pF	J	50V		R1403	ERD25FJ222K	Carbon	2.2KΩ	J	1/4W	
C1530	ECQM1H152JZ	Polyester	1500pF	J	50V		R1404	ERD25FJ684K	Carbon	680KΩ	J	1/4W	
C1531	ECCD1H470JPN	Ceramic	47pF	J	50V		R1405	ERD25FJ151K	Carbon	150Ω	J	1/4W	
C1538	ECEA1CS100	Electrolytic	10μF		16V		R1406	ERD25FJ103K	Carbon	10KΩ	J	1/4W	
							R1408	ERD25FJ273K	Carbon	27KΩ	J	1/4W	

Ref. No.	Part No.	Description				Ref. No.	Part No.	Description			
R1409	ERD25FJ104K	Carbon	100KΩ	J	1/4W	R1533	ERD25FJ103K	Carbon	10KΩ	J	1/4W
R1411	ERD25FJ222K	Carbon	22KΩ	J	1/4W	R1534	ERD25FJ154K	Carbon	150KΩ	J	1/4W
R1412	ERD25FJ100K	Carbon	10Ω	J	1/4W	R1535	ERD25FJ822K	Carbon	8.2KΩ	J	1/4W
R1413	ERD25FJ473K	Carbon	47KΩ	J	1/4W	R1537	ERD25FJ123K	Carbon	12KΩ	J	1/4W
R1414	ERD25FJ102K	Carbon	1KΩ	J	1/4W	R1541	ERD25FJ102K	Carbon	1KΩ	J	1/4W
R1415	ERD25FJ102K	Carbon	1KΩ	J	1/4W	R1542	ERD25FJ473K	Carbon	47KΩ	J	1/4W
R1416	ERD25FJ101K	Carbon	100Ω	J	1/4W	R1543	ERD25FJ330K	Carbon	33Ω	J	1/4W
R1417	ERD25FJ224K	Carbon	220KΩ	J	1/4W	R1544	ERD25FJ123K	Carbon	12KΩ	J	1/4W
R1418	ERD25FJ473K	Carbon	47KΩ	J	1/4W	R1545	ERD50FJ151	Carbon	150Ω	J	1/4W
R1419	ERD25FJ682K	Carbon	6.8KΩ	J	1/4W	R1546	ERD25FJ4R7K	Carbon	4.7Ω	J	1/4W
R1420	ERD25FJ102K	Carbon	1KΩ	J	1/4W	R1551	ERD25FJ153K	Carbon	15KΩ	J	1/4W
R1421	ERD25FJ334K	Carbon	330KΩ	J	1/4W	JC121	QJA0156	Socket (Remote)			
R1422	ERD25FJ822K	Carbon	8.2KΩ	J	1/4W	TC122	TJS848090	Socket (R/L Aux. Audio)			
R1423	ERD25FJ223K	Carbon	22KΩ	J	1/4W	JC123	XCJ6P21E-A	Hwd Phone Socket			
R1426	ERD25FJ153K	Carbon	15KΩ	J	1/4W	JC141	QJA0154	Socket (L Mic)			
R1427	ERD25FJ562K	Carbon	5.6KΩ	J	1/4W	JC142	QJA0154	Socket (L Ext. Sp)			
R1429	ERD25FJ103K	Carbon	10KΩ	J	1/4W	JC151	QJA0154	Socket (R. Mic)			
R1431	ERD25FJ824K	Carbon	820KΩ	J	1/4W	JC152	QJA0154	Socket (R. Ext. Sp)			
R1432	ERD25FJ101K	Carbon	100Ω	J	1/4W	Q0	TJS168040	Socket			
R1433	ERD25FJ103K	Carbon	10KΩ	J	1/4W	Q1	TJS168040	Socket			
R1434	ERD25FJ154K	Carbon	150KΩ	J	1/4W	QJA1	TSE80136	Switch			
R1435	ERD25FJ822K	Carbon	8.2KΩ	J	1/4W	SW101	QSSA203T	Switch			
R1437	ERD25FJ123K	Carbon	12KΩ	J	1/4W	SW102	ESD1493	Switch			
R1441	ERD25FJ102K	Carbon	1KΩ	J	1/4W	SW103	TSE80130	Switch			
R1442	ERD25FJ473K	Carbon	47KΩ	J	1/4W	D.N	TJS868250	Socket			
R1443	ERD25FJ330K	Carbon	33Ω	J	1/4W	WL	TJS868250	Socket			
R1444	ERD25FJ123K	Carbon	12KΩ	J	1/4W	WR	TJS868250	Socket			
R1445	ERD50FJ151	Carbon	150Ω	J	1/4W	CL	TJS868250	Socket			
R1446	ERD25FJ4R7K	Carbon	4.7Ω	J	1/4W	CR	TJS868250	Socket			
R1451	ERD25FJ153K	Carbon	15KΩ	J	1/4W	VR71	EVTS3MA00B13	Control	1KΩB		
R1501	ERD25FJ153K	Carbon	15KΩ	J	1/4W	VR131	EVNK4AA00B13	Control	1KΩB		
R1503	ERD25FJ222K	Carbon	2.2KΩ	J	1/4W	VR141	EVTS3AA00B15	Control	100KΩB		
R1504	ERD25FJ684K	Carbon	680KΩ	J	1/4W	VR151	EVTS3AA00B15	Control	100KΩB		
R1505	ERD25FJ151K	Carbon	150Ω	J	1/4W		TJT8902A	1P Housing Socket			
R1506	ERD25FJ103K	Carbon	10KΩ	J	1/4W		TXAJT3P245	3P Connector Ass'y			
R1508	ERD25FJ273K	Carbon	27KΩ	J	1/4W		TXAJT3P246	3P Connector Ass'y			
R1509	ERD25FJ104K	Carbon	100KΩ	J	1/4W		TXAJT4P111A	4P Connector Ass'y			
R1511	ERD25FJ222K	Carbon	2.2KΩ	J	1/4W		TXAJT5P059	5P Connector Ass'y			
R1512	ERD25FJ100K	Carbon	19Ω	J	1/4W		TXAJT7P005	7P Connector Ass'y			
R1513	ERD25FJ473K	Carbon	47KΩ	J	1/4W		TXAJT3P224A	3P Connector Ass'y			
R1514	ERD25FJ102K	Carbon	1KΩ	J	1/4W						
R1515	ERD25FJ102K	Carbon	1KΩ	J	1/4W						
R1516	ERD25FJ101K	Carbon	100Ω	J	1/4W						
R1517	ERD25FJ224K	Carbon	220KΩ	J	1/4W						
R1518	ERD25FJ473K	Carbon	47KΩ	J	1/4W						
R1519	ERD25FJ682K	Carbon	6.8KΩ	J	1/4W						
R1520	ERD25FJ102K	Carbon	1KΩ	J	1/4W						
R1521	ERD25FJ334K	Carbon	330KΩ	J	1/4W						
R1522	ERD25FJ822K	Carbon	8.2KΩ	J	1/4W						
R1523	ERD25FJ223K	Carbon	22KΩ	J	1/4W						
R1526	ERD25FJ153K	Carbon	15KΩ	J	1/4W						
R1527	ERD25FJ562K	Carbon	5.6KΩ	J	1/4W						
R1529	ERD25FJ103K	Carbon	10KΩ	J	1/4W						
R1531	ERD25FJ824K	Carbon	820KΩ	J	1/4W						
R1532	ERD25FJ101K	Carbon	100Ω	J	1/4W						